# STATISTICS

OF

# MORTALITY FROM PULMONARY PHTHISIS

IN THE

# UNITED STATES AND IN EUROPE

12 Nr 54.

No. ~~16. P.L. 1115.~~
~~16 D 114~~

BOSTON
MEDICAL LIBRARY
ASSOCIATION,
19 BOYLSTON PLACE,

Received.....

By Gift of.....

# STATISTICS

OF

# Mortality from Pulmonary Phthisis

ARMED
LIBRARY
WASHINGTON

IN THE

## United States and in Europe.

COMPILED FROM OFFICIAL HEALTH REPORTS AND FROM DATA OBTAINED FROM LIFE INSURANCE COMPANIES.

BY

WM. GLEITSMANN, M. D.

OF BALTIMORE, MD.

BALTIMORE:
TURNBULL BROTHERS.
1875.

# STATISTICS

OF

# Mortality from Pulmonary Phthisis

IN THE

## UNITED STATES AND IN EUROPE.

*Compiled from Official Health Reports and from Data obtained from Life Insurance Companies.*

By WM. GLEITSMANN, M. D.

OF BALTIMORE, MD.

---

It is an innate propensity of the human mind to examine into the primary causes of phenomena occurring around it. The scientific researches originating in this desire for information, to be valuable, must be based upon close and careful observation; and as far as the empirical sciences are concerned, consist in discussing accumulated observations and the careful comparison of facts, to warrant a logical deduction of laws. The science more especially devoting itself to this task is that of Statistics, whose value is yearly being more and more appreciated and called into requisition. In medicine, statistics have attained a vast importance. Thirty years ago our knowledge of the frequency of certain diseases, their causes and their mortality, and the results of particular modes of treatment, was but meagre. Only when comparative tables, the results of observation, came to our aid, can we claim to have advanced towards trustworthy facts. The objections raised against statistics are: the often seemingly unreliable and frequently even contradictory results by different investigators, and the dryness of columns of figures. Neither of these objections can truthfully be raised against this science as such; the first of these objections being valid only as to the in-

vestigator himself, who has either drawn from incorrect sources, or made hasty deductions from insufficient data, which cannot stand a comparison with materials of a wider and more comprehensive range. Now, as far as numbers are concerned, their value lies not in themselves alone, but in their supplying a foundation for the laws that are deduced from them. But before we can proceed to deduce laws, we must at first be amply provided with facts of experience, and a vast amount of correct comparative data; and it is this invaluable material that statistics supply.

One of the most difficult, but at the same time also the most beneficial and interesting problems which statistical science is called upon to solve in the department of medicine, is the investigation of laws which determine the life- and death-rate of individuals and entire communities, and consequently their condition of health and disease. Before we can successfully wage war against any disease, it is necessary to have a thorough understanding of its primary causes, and for this reason statistics are the surest aid to hygiene.

In how great a measure the want of this understanding is felt by all who have the public welfare in this respect at heart, may be seen from the numerous efforts, not alone of private corporations, but also of City and State authorities. Throughout the whole country we observe great efforts made to establish offices for keeping records of vital statistics, in order to investigate the cause and spread of disease, and to discover as well as mitigate those evil influences that enhance its progress. The greater share in this highly commendable undertaking may justly be claimed by the Boards of Health in various cities of the Union, whose reports are published with an accuracy and minuteness of detail worthy of all praise and approbation. Next in order, the State Boards of Health have deserved great credit for discovering and removing many hotbeds of disease. In collecting information for these pages, I

have furthermore met with frequent intimations from various cities that a Board of Health is about to be organised. All these efforts only serve to illustrate the growing conviction of the vast importance of these objects.

Of all causes of mortality, Pulmonary Phthisis takes the most prominent place, and hence an especial study as to its distribution cannot fail to be of interest. The most prominent professors of our science have given the study of the phases and character of this disease their careful attention. As far as I am acquainted, no effort has been made to make a uniform statistical compilation of the mortality from Phthisis in different cities of the United States, and the desire of obtaining as correct a view of these facts as possible has induced me to venture upon the present task. Although the second volume of the United States Census for 1870 contains, among other highly interesting data, very concise statements of the death-rate and cause of mortality throughout the Union, yet these tables only refer to entire States, not to cities, counties, or smaller political divisions. We are furthermore justified in assuming that the mortality indicated in the Census does not correspond with the actual death-rate, as indeed we may learn from the remarks preceding the respective tables. The difference resulting from this mode of calculation has been shown by E. B. Elliott, Chief Clerk of the Bureau of Statistics of the Treasury Department, to amount to 41 per cent., and the result of my studies is quite in accordance with this statement, as will be more fully shown in Table I. The value of the statistics of the United States Census arises, as the Superintendent, F. A. Walker, most appropriately says, from the consideration that its tables distribute a body of deaths approaching half a million, among the several periods of life, between the two sexes, according to cause and month of death, by race, nationality, and occupation. The reasons which prompted me to include the life insurance companies in these statistics will be explained hereafter.

In order to obtain perfectly reliable data, it was necessary to address myself directly to each single corporation or society; and in doing so, I went to the trouble of specifying in every instance the object of the desired information, in order to secure an answer by awakening an interest in the matter. This direct address to the respective authorities has given me the advantage of obtaining my data from original and authentic sources, by this means ensuring a strong claim to credibility.

I have been careful to avoid comprehensive inferences from my compilations, in order that the objection I have mentioned against statistics may not be raised against my work too. Before general laws of the origin of any disease can be established, and especially before a general law respecting a disease of such universal predominance as the one in question can with safety be deduced, a much wider range of numbers must be obtained than the observations of a single year can furnish. I shall therefore rest content to have pointed out all undeniable conclusions, and to indicate the nature of the future work which will be required to bring these highly important researches to a fair conclusion.

By a systematic arrangement of the various facts collected in tables, I hope not only to have furnished some important data, but also to have pointed out once more the terrible mortality annually taking place from Phthisis. The more earnestly and frequently these facts are brought to the notice of the medical profession, the more will all those aids to prevention and remedies be called into operation which experience and science place within our reach. Phthisis cannot be successfully combatted when the patient remains in the same condition of life under which he contracted the disease. He must guard against all influences which interfere with the restoration of his reduced health. We meet by far the happiest results in the treatment of Phthisis at those establishments where a pleasant social

life prevails, and in a still greater measure does this apply to those Institutes founded on the principle of altitude. Experience has here most undeniably proved what may be achieved by calling to aid all curative powers at our command, all of which questions I have considered more fully in a former essay.* Should the views expressed here attract the attention of physicians to this part of the subject, so that some good may accrue from it towards the cause at large, or even to single individuals, my labor will not be in vain.

The facts furnished by the statistics of cities and life insurance companies form a leading feature of this paper. The constant growth of these companies, together with their deep significance respecting our social and family relations, created the wish of investigating them from a new stand-point, and not from that of financial considerations. Regarded in this light, the life insurance institution has in many instances proved a blessing, and it is therefore all the more important that a comparative examination of the status of mortality should be instituted. I have made the attempt so much more willingly, as a comparison between the mortality of the population of communities at large, and of societies whose members are only admitted after a careful medical examination, must afford opportunities for many interesting observations. The tables of insurance companies contain material which could not be gathered from cities, as for instance Table X., where we find an indication of the duration of the disease from its commencement down to its fatal termination, at various periods of age, supposing that only in quite exceptional cases persons already tainted by disease succeed in smuggling themselves into insurance companies. While preparing my work I met with an article, published in Germany, on the mortality from Pulmonary Phthisis in nineteen German life insurance

* On the Nature and Curability of Pulmonary Phthisis. Richmond and Louisville Medical Journal, July, 1874, p. 37, et seq.

companies in the year 1871.* To be possessed of these data was so much more gratifying to me, as they afford an opportunity for comparison, not only between cities within the Union, but also with foreign insurance companies. I may as well observe at once that our American companies have the advantage over the German companies, since they not only exhibit a lower general death-rate, but that moreover on an average only one-sixth of all the deaths come under the head of Pulmonary Phthisis, against one-fifth of the German companies (see Table VIII.). The small difference to the disadvantage of our companies in Table X., is explained by the fact that among the German companies there are more old companies, and but few of recent organisation. This factor of course affects the duration of insurance to a considerable extent.

Throughout this essay the year 1873 has been taken as a basis for the calculations, with but a few isolated exceptions, that year having a normal mortality, except a yellow fever epidemic in some Southern cities, and therefore affording a reliable standard. It possessed the other advantage that only three years previously the statistics of population had been gathered in the U. S. Census, so that the census numbers could be adopted where it was impossible to obtain any other information, the small difference of time not materially deducting from their value.

In order to collect the required information, communication was had with 185 cities, 158 of which have a population of more than 10,000 inhabitants, as indicated in Dr. J. M. Toner's Dictionary of Elevation and Climatic Register. Besides this, 27 cities having stations of the U. S. Signal Service existing in 1873, were addressed. I asked for a report of the Board of Health; but to those cities where such an institution did not exist I proffered the questions:

1. What was the number of inhabitants in 1873?

---

* Dr. Oldendorff's Report of the Royal Prussian Statistical Bureau, 1873, p. 302, et seq.

2. How many deaths from all causes occurred in 1873?

3. How many deaths from Pulmonary Phthisis? If possible, state the numbers as to the months.

Altogether I received 102 replies, 65 of which could be used for these statistics; while 37 proved insufficient, as the records lacked completeness or could not be furnished. To those 83 cities not giving an answer, postal cards with the necessary inscriptions on them had been inclosed with the letter soliciting information, in order to guard against the reproach of not having supplied proper formulæ and facilities. Reports of the Boards of Health have been forwarded by 22 cities, yielding very valuable material, which I have carefully discussed. The remark may be of interest that 7 out of the 22 reports show the causes of death, according to the well-known arrangement adopted for years past by the Registrar-General of England in his annual reports. The other 15 mostly enumerate the causes of deaths in alphabetical order. I regretted very much not to have had the report of the Board of Health of New York at hand. Since the report for 1872 furnishes the most comprehensive material, I have deemed it expedient to make use of it whenever required.

Seven tables refer to cities; the first shows the number of deaths from Pulmonary Phthisis and from all causes, in sixty-five cities, while the others state special moments respecting those only who died from Phthisis. The second presents the ratio as to the sexes; the third, as to age and sex; the fourth up to the seventh, as to the months and seasons, and the fourth as to the months and seasons alone; the fifth, as to seasons and sex; the sixth, as to seasons, sex, and age; and the seventh, as to seasons and meteorological conditions.

## TABLE I.

In this paper I adhere strictly to the data furnished me, and therefore it is not impossible that the reported num-

bers as to population may somewhat surpass the real number of inhabitants, especially so because some cities try to show a low percentage of mortality, which is effected by a superficial estimate of population at too high a rate. These are, however, isolated cases, and I believe that this table presents a reasonably correct ratio of mortality, both from all causes, and from Phthisis alone. The cities are arranged according to the ratio of deaths from the latter cause and the population. The last column indicates the order in which the cities would follow if they were arranged according to the number of deaths from all causes. The bearing of the remaining columns can easily be seen from the headings. Only in seven instances do the data not fall within the year 1873. These cases are specially noted. Whenever the population of 1873 was not known, it is also stated; in such cases the U. S. Census of 1870 is quoted. Where it appeared advisable, short explanatory notes are appended.

In this connection I would direct the reader's attention to a point which, it seems, is nowhere fairly considered, a neglect which leads frequently to false results and views. If we consider the mortality of a place as to a disease, it becomes necessary to compare the number of deaths from that respective disease with that of the inhabitants, and not to be guided by the percentage of deaths from one cause out of all deaths. If in the table we arrange the cities according to the third but last column, then we have—to quote some examples—the following order:

| | | |
|---|---|---|
| Memphis | 1 | (on the table 38) |
| Montgomery | 3 | ( " " " 49) |
| New Orleans | 23 | ( " " " 63) |
| Mobile | 27 | ( " " " 61) |

*Vice-versa:*

| | | |
|---|---|---|
| San Diego Co | 64 | (on the table 6) |
| Stockton | 62 | ( " " " 21) |
| Keokuk | 58 | ( " " " 25) |
| Williamsport | 45 | ( " " " 3) |

The difference arises from the high, or, in the second case, low death-rate from all causes. These few examples show clearly how unsafe it is to establish the frequency of deaths from one cause out of the percentage of deaths from all causes. To find in how many cases a disease may prove fatal in one place, it is necessary to know how many of the inhabitants fall victims to that disease.

# TABLE I.

*Deaths from Pulmonary Phthisis and from all Causes in 65 Cities, including data from the U. S. Census of 1870, and the Report of the Registrar-General of England.*

| No. | CITIES. | POPULATION. | Deaths from all causes. | Deaths to 1000 persons living. | Deaths from Phthisis. | Percent'ge of Deaths from Phthisis to total mortality. | Deaths from Phthisis to 1000 persons living. | Order of Cities according to total mortality. |
|---|---|---|---|---|---|---|---|---|
| 1 | Fond du Lac, Wis. (*a*) | 15600 | 121 | 7.82 | 11 | 9.09 | .70 | 3 |
| 2 | Galesburg, Ills | 12000 | 135 | 11.25 | 9 | 6.66 | .75 | 5 |
| 3 | Williamsport, Pa | 16000 | 90 | 5.62 | 13 | 14.44 | .85 | 1 |
| 4 | Salt Lake City, Utah | 25000 | 414 | 16.56 | 27 | 6.52 | 1.08 | 20 |
| 5 | Peoria, Ills | 30000 | 343 | 11.43 | 37 | 10.81 | 1.23 | 6 |
| 6 | County of San Diego, Cal | 9000 | 53 | 5.88 | 13 | 24.52 | 1.33 | 2 |
| 7 | Bridgeport, Conn | 25000 | 388 | 15.52 | 34 | 8.76 | 1.36 | 16 |
| 8 | Terre Haute, Ind | 25000 | 336 | 13.44 | 34 | 10.11 | 1.36 | 8 |
| 9 | Hamilton, Ohio | 15000 | 216 | 14.4 | 21 | 9.72 | 1 4 | 11 |
| 10 | Buffalo, N. Y | 170000 | 2336 | 13.74 | 243 | 10.40 | 1.42 | 10 |
| 10 | Wheeling, W. Va | 26000 | 410 | 15.76 | 37 | 9.02 | 1.42 | 18 |
| 12 | East Saginaw, Mich | 17000 | 289 | 17. | 26 | 8.99 | 1.52 | 23 |
| 12 | Elmira, N. Y | 19000 | 291 | 15.31 | 29 | 9.96 | 1.52 | 14 |
| 14 | Hartford, Conn | 45000 | 773 | 17.17 | 69 | 8.92 | 1.53 | 24 |
| 15 | Chicago, Ills | 400000 | 9557 | 23.89 | 639 | 6.68 | 1.59 | 46 |
| 15 | Cleveland, Ohio | 137000 | 2499 | 18.24 | 219 | 8.76 | 1.59 | 26 |
| 17 | Utica, N. Y. (*b*) | 30000 | 411 | 13.7 | 48 | 11.68 | 1.6 | 9 |
| 18 | Newport, R. I | 14000 | 303 | 21.64 | 23 | 7.58 | 1.64 | 40 |

TABLE I.—Continued.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 19 | St. Louis, Mo | 450000 | 8551 | 19. | 751 | 8.78 | 1.66 | 29 |
| 20 | Augusta, Ga | 20000 | 747 | 37.35 | 38 | 5.08 | 1.9 | 62 |
| 21 | Milwaukee, Wis | 71440* | 1878 | 26.28 | 136 | 7.23 | 1.93 | 53 |
| 21 | Stockton, Cal | 12000 | 120 | 10. | 22 | 18.33 | 1.93 | 4 |
| 23 | District of Columbia (*c*) | 150000 | 2327 | 15.51 | 292 | 12.54 | 1.94 | 15 |
| 24 | Springfield, Mass | 30000 | 654 | 21.46 | 71 | 10.85 | 2.03 | 36 |
| 25 | Keokuk, Iowa | 15000 | 181 | 12.06 | 31 | 17.12 | 2.06 | 7 |
| 26 | Syracuse, N. Y. (*d*) | 58000 | 912 | 15.70 | 121 | 13.26 | 2.08 | 17 |
| 27 | Louisville, Ky | 165984 | 2816 | 16.96 | 358 | 12.71 | 2.15 | 22 |
| 28 | St. Paul, Minn | 35000 | 581 | 16.60 | 78*e* | 13.42 | 2.22 | 21 |
| 29 | Poughkeepsie, N. Y | 22500 | 372 | 16.53 | 51 | 13.70 | 2.26 | 19 |
| 30 | Providence, R. I | 99608 | 1719 | 17.26 | 231 | 13.43 | 2.31 | 25 |
| 31 | Oakland, Cal | 15387 | 227 | 14.75 | 36*f* | 15.85 | 2.33 | 13 |
| 32 | Bangor, Me | 19000 | 275 | 14.47 | 46 | 16.72 | 2.42 | 12 |
| 33 | Pittsburg, Pa | 133000 | 3519 | 26.45 | 326 | 9.26 | 2.45 | 54 |
| 34 | Dayton, Ohio | 35000 | 583 | 19.88 | 89 | 12.77 | 2.51 | 31 |
| 35 | Cincinnati, Ohio | 246923 | 5641 | 22.84 | 657 | 11.64 | 2.66 | 43 |
| 36 | Newburgh, N. Y | 17500 | 320 | 18.28 | 47 | 14.68 | 2.68 | 27 |
| 37 | San Francisco, Cal. (*g*) | 188323 | 3641 | 19.33 | 514 | 14.11 | 2.72 *h* | 30 |
| 38 | Memphis, Tenn. (*i*) | 50000 | 2816*j* | 56.32 | 141 | 5. | 2.82 | 65 |
| 39 | Albany, N. Y | 95000 | 1768 | 18.80 | 277 | 15.50 | 2.91 | 28 |
| 40 | New Haven, Conn | 50840* | 1277 | 25.11 | 151 | 11.82 | 2.97 | 49 |
| 41 | Philadelphia, Pa | 750000 | 15845 | 21.12 | 2292 | 14.46 | 3.05 | 34 |
| 42 | Waterbury, Conn | 14000 | 301 | 21.5 | 43 | 14.28 | 3.07 | 37 |
| 43 | Brooklyn, N. Y | 435000 | 10968 | 25.19 | 1376 | 12.55 | 3.16 | 51 |

## TABLE I.—Continued.

*Deaths from Pulmonary Phthisis and from all Causes in 65 Cities, including data from the U. S. Census of 1870, and the Report of the Registrar-General of England.*

| No. | CITIES. | POPULATION. | Deaths from all causes. | Deaths to 1000 persons living. | Deaths from Phthisis. | Percent'ge of Deaths from Phthisis to total mortality. | Deaths from Phthisis to 1000 persons living. | Order of Cities according to total mortality. |
|---|---|---|---|---|---|---|---|---|
| 44 | Chelsea, Mass | 20000 | 455 | 22.75 | 64 | 14.06 | 3.2 | 42 |
| 45 | Paterson, N. J. (*k*) | 38000 | 942 | 24.78 | 128 | 13.65 | 3.36 | 48 |
| 46 | Norfolk, Va | 20000 | 614 | 30.7 | 69 | 11.23 | 3.45 | 57 |
| 47 | Newark, N. J | 125000 | 3735 | 29.88 | 434 | 11.62 | 3.47 | 56 |
| 48 | Lynn, Mass | 29000 | 681 | 23.48 | 102 | 14.97 | 3.51 | 45 |
| 49 | Montgomery, Ala | 15000 | 836 | 55.73 | 53 | 6.33 | 3.53 | 64 |
| 50 | Haverhill, Mass | 14000 | 304 | 21.71 | 51 | 16.77 | 3.64 | 41 |
| 51 | Baltimore, Md | 303000 | 7614 | 25.12 | 1108 | 14.55 | 3.65 | 50 |
| 52 | Boston, Mass | 325000 | 7869 | 24.21 | 1194 | 15.17 | 3.67 | 47 |
| 53 | Lawrence, Mass | 32000 | 692 | 21.62 | 119 | 17.19 | 3.71 | 39 |
| 54 | Worcester, Mass | 50000 | 1044 | 20.88 | 188 | 18. | 3.76 | 33 |
| 55 | Taunton, Mass | 20000 | 517 | 25.85 | 78 | 16.25 | 3.9 | 52 |
| 56 | Richmond, Va | 60705 | 2037 | 33.39 | 239 | 11.73 | 3.93 *l* | 59 |
| 57 | Charleston, S. C | 48956* | 1516 | 30.96 | 193 | 12.73 | 3.94 *m* | 58 |
| 58 | Salem, Mass | 26000 | 551 | 21.19 | 104 | 18.87 | 4. | 35 |
| 59 | New York, N. Y | 1000000 | 29084 | 29.08 | 4134 | 14.22 | 4.13 | 55 |
| 60 | Lowell, Mass | 50000 | 1161 | 23.22 | 207 | 17.74 | 4.14 | 44 |
| 61 | Mobile, Ala | 33000 | 1171 | 35.48 | 137 | 11.69 | 4.15 | 61 |
| 62 | Newburyport, Mass | 12500 | 253 | 20.24 | 53 | 20.94 | 4.24 | 32 |

# TABLE I.—Concluded.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 63 | New Orleans, La..... | 200000 | 7505 | 37.52 | 850 | 11.32 | 4.25 | 63 |
| 64 | Fall River, Mass..... | 38000 | 1343 | 35.34 | 162 | 12.06 | 4.26 | 60 |
| 65 | Portland, Me..... | 32000 | 691 | 21.59 | 173 | 25.03 | 5.40 | 38 |
| | Total..... | 6,700275 | 150617 | 22.47 | 19547 | 12.97 | 2.91 | |
| | U. S. Census, 1870..... | 38,558371 | 492263 | 12.76 | 69896 | 14.19 | 1.81 | |
| | England, 1867..... | 20,066224 | 471073 | 23.47 | 55042 | 11.68 | 2.74 | |
| | London, 1867..... | 2,803989 | 70924 | 25.29 | 8928 | 12.58 | 3.18 | |

NOTES.—(*) Population according to U. S. Census of 1870.
(*a*) From August 1st, 1873—1874.
(*b*) From July 1st, 1873—1874.
(*c*) From October 1st, 1872—1873.
(*d*) From August 1st, 1873—1874.
(*e*) According to a communication of Dr. Thos. R. Potts, most of the deaths occurred among the immigrants, some few among the natives of mixed blood, and none among those of pure blood.
(*f*) Dr. Sherman reports that of all the deceased, more than one-half had not been living in the place for fully six months.
(*g*) From August 1st, 1872—1873.
(*h*) The number is increased by the number of deaths (67) of the Chinese (12000), whose death ratio, as considered by itself, is 5.58 per 1000.
(*i*) From July 1st, 1873—1874.
(*j*) Dr. Taylor reported 192 deaths from cholera, and 1313 from yellow fever: considering the number of deaths after the deduction of those special cases, the death ratio would be 27.22 per 1000, and Memphis range as No. 55 in the last column.
(*k*) From April 1st, 1873—1874.
(*l*) The number is increased by the mortality (148) among the colored people (27213); their death rate by itself is 5.43 per 1000.
(*m*) The number is increased by the deaths (139) of colored people (26811,) whose death ratio is 5.18 per 1000.

Examining into the results, we find that about one-eighth (in reality 12.97) of all cases of death are caused by Phthisis, and with this agrees also the actual death-rate; for out of 1,000 inhabitants 22.47 died from all causes, and 2.91 from Phthisis, this being also about one-eighth. Furthermore, we observe a remarkable conformity of results with the U. S. Census, if the difference heretofore alluded to is taken into consideration. Assuming that the mortality of the Census amounts to 59 per cent. of the real number of deaths, we find for 100 per cent. of deaths from all causes 21.62 per 1,000, and 3.06 from Phthisis—a difference (as to the census) of 0.85 less for the former and of 0.15 more of the latter class. This may also be considered as a proof of the correctness of the calculation respecting the insufficiency of percentage in the census. I regret not to have been able to obtain a more recent report of the Registrar-General of England; yet I am of opinion th at the data which can be gathered from this report should not be entirely disregarded, because the work is well known and highly esteemed both for its completeness and its reliability. We see that England shows a larger death-ratio from all causes, and one somewhat smaller from Phthisis. London presents considerably more favorable ratios than New York, and as to mortality from Phthisis ranks next to Brooklyn.

I am sorry not to have found within my reach any comprehensive statistics of European countries of a recent date, and I must therefore limit myself to a few data on Germany, gathered from Dr. Oldendorff's work. The kingdom of Bavaria shows for the years of 1844–1850 a mortality from Phthisis of 3.7 per 1,000, Munich for 1860–1869 of 4.3, Stuttgardt for 1870 and 1871 of 2.8 and 2.6, Vienna for 1869 and 1871 of 7.5 and 8.2, Berlin for 1868, '69, '70 ,and '71 of 3.8, 4.0, 4.3, 4.2. Oesterlein in his Hand-book of Statistics reports the general mortality of Europe to be 25 per cent., and that from Phthisis 2.5—4.0 per 1,000, *i. e.* about one-

ninth to one-sixth of all deaths, which is in conformity with our results.

If we consider the particular data of the table, we find twenty-five States and two Territories represented in the same. Massachusetts furnished more data than any other, twelve cities having sent replies; next comes New York, with answers from ten cities. In two instances the data are not limited to cities, but comprise also the surrounding country. I deemed it advisable to introduce the data concerning San Diego county as from a point in the remotest southwest of the country, especially since the reported 13 cases of deaths from Phthisis are stated as having occurred among immigrants only. The report of the Board of Health of Washington comprises the whole District of Columbia, and I was unable to obtain any data concerning Washington City alone. I may also mention in this connection that the results in the District of Columbia for 1873 differ considerably from those of 1870, the U. S. Census stating the deaths from Phthisis at 2.98 per 1,000.

The data respecting elevation, an element so highly important regarding the development, spread and treatment of Phthisis, could not be taken into consideration in this table. According to Toner's Dictionary of Elevations, none of the cities named on the table reaches an elevation of 1,000 feet above the level of the sea, except Salt Lake City, which lies 4,331 feet high. Next to it comes Keokuk, Iowa, with an elevation of 952 feet. This shows how small is the elevation above the sea of all our larger cities.

Regarding the geographical position of the cities, we find that the Western cities show generally a more favorable ratio. Not considering Buffalo, we find Chicago and St. Louis in advance of other cities with a similar number of inhabitants, and Cincinnati with a ratio of mortality from Phthisis below the average, closes the list of Eastern cities. My attention has been directed to the facts that the Western towns and cities have been more recently founded

than those of the East, and that their population consists of more vigorous elements, who, quitting the East, have settled there, whilst the less vigorous remained in their old homes.

Respecting the great mortality in Massachusetts, Dr. Bowditch has expressed himself so fully in the report of the State Board of Health of Massachusetts for 1872, that I need merely refer to it.

It would extend this paper too much were I to take into consideration local circumstances and the conditions arising from them, causing the greater or less number of deaths from Phthisis; these points must be referred to the Boards of Health for examination. As to the relation between temperature, climate in general, and Phthisis, Table VIII. gives special data.

In conclusion, be it observed that of the sixteen cities with 100,000 inhabitants and more, only five show a mortality from Phthisis of less than 2.00 per 1,000. Of the nine cities with 200,000 and more inhabitants, only two show a mortality of less than 2.00, one of less than 3.00, and the remaining six of more than 3.00 per 1,000.

## TABLE II.

Table II. and the succeeding ones have reference to the various relations of deaths from Phthisis. Reference to sex was made in four reports only. Therefore, in order to gain a wider range by means of larger numbers I have, in addition, availed myself of the New York report for 1872, the U. S. Census, and the English report. The table gives the absolute as well as relative proportions of the sexes, and in one case, where the data were furnished, also the relation of sex to the total population.

# TABLE II.

*Deaths from Phthisis, in relation to Sex, from 5 Cities, the whole United States, England and London.*

| CITIES OF THE UNITED STATES. | Deaths from Phthisis. | | | Percentage. | | Deaths from all Causes. | | Percent'ge of Deaths from Phthisis to total mortality. | |
|---|---|---|---|---|---|---|---|---|---|
| | M. | F. | Total. | M. | F. | M. | F. | M. | F. |
| Richmond..... | 125 | 114 | 239 | 52.30 | 47.69 | 1069 | 968 | 11.69 | 11.77 |
| Pittsburg..... | 157 | 169 | 326 | 48.15 | 51.84 | 1854 | 1665 | 8.46 | 10.15 |
| Boston..... | 568 | 626 | 1194 | 47.57 | 52.42 | 4099 | 3770 | 13.85 | 16.60 |
| Philadelphia..... | 1093 | 1199 | 2292 | 47.69 | 52.30 | 8133 | 7712 | 13.43 | 15.54 |
| New York, 1872..... | 2176 | 2098 | 4274 | 50.91 | 49.08 | 17327 | 15320 | 12.55 | 13.69 |
| London, 1867..... | 4977 | 3951 | 8928 | 55.75 | 44.24 | 36378 | 34546 | 13.68 | 11.43 |
| England, 1867..... | 26909 | 28133 | 55042 | 48.88 | 51.11 | 242588 | 228485 | 11.09 | 12.31 |
| United States, 1870 | 33971 | 35925 | 69896 | 40.60 | 51.39 | 260673 | 231590 | 13.03 | 15.51 |
| " " | ..... | ..... | ..... | ..... | ..... | | | | |
| " " | ..... | ..... | ..... | ..... | ..... | Population. | | Deaths from Phthisis to 1000 persons liv'g. | |
| | | | | | | M. | F. | M. | F. |
| " " | 33971 | 35925 | ..... | ..... | ..... | 19,493565 | 19,064806 | 1.71 | 1.88 |

In a variety of absolute numbers we observe a remarkable concurrence of the preponderance of the female sex, in a comparison of deaths from Phthisis with total mortality. London alone is an exception; whereas the U. S. Census on the contrary shows a larger female mortality, compared with the total population. If in addition we take for the actually somewhat lower female population the same number as for the male, we would under conditions then similar have 36,732 female deaths, or a surplus of 2,761 over the male. The preponderance of female mortality is shown even more strikingly in the following table, to which I refer for comparison. But this is not the case in all countries, as for instance the statistics of the Kingdom of Bavaria present a larger mortality amongst males than females, and according to Oesterlein the same status has prevailed in Geneva within a space of thirteen years.

We observe, moreover, in the eight instances, that amongst deaths from all causes the numbers of males exceed those of the females.

## TABLE III.

Since, with the exception of the New York report for 1872, none other gives sex and age at the same time, nor yet a classification of ages from 5 to 5 years, I have constructed the following table upon the U. S. Census, which furnishes them to completeness. The question of deciding which is the most dangerous age for either sex, was of sufficient interest to strive for the most reliable inferences by calculations with large numbers. I have made an exception in the last two columns by confining myself to one decimal, as this does not interfere with the result.

# TABLE III.

*Deaths from Phthisis, in relation to Sex and Age, in the United States, compiled from the Census of* 1870.

| AGE. | Deaths from Phthisis. | | | | Deaths from all Causes. | | Percentage of Deaths from Phthisis to total mortality. | |
|---|---|---|---|---|---|---|---|---|
| | Total number. | | Percentage. | | | | | |
| | M. | F. | M. | F. | M. | F. | M. | F. |
| Unknown | 73 | 27 | .21 | .07 | 688 | 332 | ..... | ..... |
| Under 1 year | 1067 | 977 | 3.14 | 2.71 | 60876 | 49569 | 1.7 | 1.9 |
| 1 to 2 years | 541 | 587 | 1.59 | 1.63 | 23075 | 20588 | 2.3 | 2.8 |
| 2 to 3 " | 337 | 344 | .99 | .95 | 12577 | 11367 | 2.9 | 3. |
| 3 to 4 " | 184 | 187 | .54 | .52 | 7636 | 7256 | 2.4 | 2.5 |
| 4 to 5 " | 145 | 114 | .42 | .31 | 5341 | 4928 | 2.7 | 2.3 |
| Under 5 years | 2274 | 2209 | 6.69 | 6.14 | 109505 | 93708 | 2. | 2.3 |
| 5 to 10 " | 459 | 494 | 1.35 | 1.37 | 13714 | 12615 | 3.3 | 3.9 |
| 10 to 15 " | 501 | 1056 | 1.47 | 2.93 | 8186 | 7793 | 6.1 | 13.5 |
| 15 to 20 " | 1756 | 3431 | 5.16 | 9.55 | 9521 | 10741 | 18.4 | 31.9 |
| 20 to 25 " | 3938 | 5138 | 11.59 | 14.30 | 12539 | 13449 | 31.4 | 38.2 |
| 25 to 30 " | 3904 | 4684 | 11.49 | 13.03 | 10736 | 11786 | 36.3 | 39.7 |
| 30 to 35 " | 3329 | 3556 | 9.79 | 9.89 | 9456 | 10072 | 35.2 | 35.3 |
| 35 to 40 " | 3262 | 3215 | 9.60 | 8.94 | 10205 | 9885 | 31.9 | 32.5 |

## TABLE III.—Concluded.

*Deaths from Phthisis, in relation to Sex and Age, in the United States, compiled from the Census of* 1870.

| AGE. | Deaths from Phthisis. | | | | Deaths from all causes. | | Percentage of Deaths from Phthisis to total mortality. | |
|---|---|---|---|---|---|---|---|---|
| | Total number. | | Percentage. | | | | | |
| | M. | F. | M. | F. | M. | F. | M. | F. |
| 40 to 45 years | 2631 | 2422 | 7.74 | 6.74 | 9569 | 8267 | 27.4 | 29.2 |
| 45 to 50 " | 2423 | 1843 | 7.13 | 5.13 | 9551 | 6584 | 25.3 | 27.9 |
| 50 to 55 " | 2130 | 1655 | 6.27 | 4.60 | 9522 | 6601 | 22.3 | 25. |
| 55 to 60 " | 1657 | 1221 | 4.87 | 3.39 | 7833 | 5413 | 21.1 | 22.5 |
| 60 to 65 " | 1704 | 1407 | 5.01 | 3.91 | 9061 | 6822 | 18.8 | 20.6 |
| 65 to 70 " | 1341 | 1172 | 3.94 | 3.26 | 8172 | 6287 | 16.4 | 18.6 |
| 70 to 75 " | 1118 | 993 | 3.29 | 2.76 | 7887 | 6732 | 14.1 | 14.7 |
| 75 to 80 " | 745 | 696 | 2.19 | 1.93 | 5987 | 5615 | 12.4 | 12.3 |
| 80 to 85 " | 502 | 440 | 1.47 | 1.22 | 4830 | 4762 | 10.3 | 9.2 |
| 85 to 90 " | 162 | 184 | .47 | .51 | 2205 | 2322 | 7.3 | 7.9 |
| 90 to 95 " | 49 | 56 | .14 | .15 | 941 | 1042 | 5.2 | 5.3 |
| 95 years and over | 13 | 26 | .03 | .07 | 565 | 762 | 2.3 | 3.4 |
| Total | 33971 | 35925 | 100.00 | 100.00 | 260673 | 231590 | 13.03 | 15.51 |

The absolute death-rate, when reduced to percentage, is nearly alike for both sexes up to the 15th year, rising, however, with great rapidity for the female sex to a maximum of 14 per cent. for the ages of twenty to twenty-five years, in order to fall at first slowly and then more rapidly below the male rate from the thirty-fifth year onward. The small deviations for the three advanced ages are of no importance. The male rate rises in a like manner, though more slowly from the fifteenth year, as its maximum of 11.5 per cent. is lower than the female maximum at the same age. Whilst the numbers up to the fifteenth year remain nearly equal, there die in contrast to the younger years decidedly more men than women in advanced years. Quite a noticeable feature is observed by the slight increase for both sexes in the years between sixty and sixty-five, which I have also found in the New York report for 1872, for the female sex at least. Whereas the male figure did not decrease but remained the same for this and the preceding period, there died seventy-five women between the years of sixty to sixty-five, viz., ten more than in the years from fifty-five to sixty. I am not able to assert whether this fact will be confirmed by repeated and extended observations, but am content to have directed attention to it.

The last two columns serve to exhibit the vast share which Phthisis claims among all the death-causes during certain ages. With three exceptions, which are of no importance (4 to 5, 75 to 80, and 80 to 85 years), the female sex shows a uniform preponderance over the male, having its origin in the lower general death-rate and higher mortality from Phthisis. Beginning its rise with the tenth year and going thence upwards, it yields between the ages of fifteen to forty years more than a third, and up to the sixty-fifth year more than a fifth of all deaths in consequence of Phthisis. The highest number of males is limited to the age of twenty to forty, and sinks below one-fifth with the sixtieth year.

The greater mortality for females has been demonstrated beyond a doubt in the foregoing, for the United States at least. Even if the absolute rate of mortality from Phthisis for females actually is in excess of that for males, this fact alone would not warrant the inference. Where the female population is more numerous than the male a larger number of deaths from Phthisis may occur among females, although the disease is for all that not more dangerous to them. But when out of one hundred deaths from all causes 15.5 per cent. females and only 13 per cent. males fall to the share of Phthisis, we have the proof on hand. In addition we have the fact that the unfavorable condition exists in all the stages of life for women, and from Table II. we see that of living population more women than men die. The greatness of the numbers of the table is a warrant for the correctness of the inference.

May not perhaps the reason be, that women in this country take much less exercise in the open air than in England and in Europe generally? A great majority of European cities are surrounded by delightful pleasure grounds in their immediate vicinity, which are much frequented by promenaders of both sexes.

The influence of this disease is not to be mistaken in the rise and fall of the numbers of the general death-rate, as apart from the mortality during early years, we here observe the two highest rates of mortality from Phthisis (20 to 25, and 25 to 30 years) tally with the highest rates of general mortality.

Lastly, the often mentioned large mortality of children is also seen from the table, aggregating for male children under 1 year 23 per cent., under 5 years 42 per cent.; for female under 1 year 20 per cent., under 5 years 40 per cent. of the total mortality.

## TABLE IV.

The question concerning the influence of the seasons upon deaths from Phthisis appeared to me sufficiently important to justify a special inquiry in my circular letters. Only nine cities did not give this information, and this explains the difference in the number of cities of the first and present table. As may be readily observed, the order has been established according to the actual number of deaths, as the larger numbers at the end of the table allow more readily a disregard of mere accidentals, and in consequence afford a better opportunity for deductions. The calculation for the seasons is executed in the ordinary manner, December being counted as the first of the winter months.

# TABLE IV.

*Deaths from Phthisis, according to Months and Seasons, in 56 Cities.*

| CITIES. | Dec. | Jan. | Feb. | Mar. | Apl. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Winter | Spring. | Summer | Fall. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Galesburgh, Ills... | 1 | ..... | 1 | 1 | ..... | 1 | 2 | 1 | 1 | ..... | ..... | 1 | 2 | 2 | 4 | 1 | 9 |
| Williamsport, Pa. | 1 | 2 | 1 | 2 | 1 | 2 | 1 | ..... | ..... | 2 | ..... | 1 | 4 | 5 | 1 | 3 | 13 |
| Hamilton, O..... | 3 | 3 | 2 | 4 | ..... | 2 | 3 | ..... | ..... | 1 | 1 | 2 | 8 | 6 | 3 | 4 | 21 |
| Stockton, Cal..... | 1 | 3 | 1 | 2 | 2 | 1 | 4 | 4 | 2 | ..... | ..... | 2 | 5 | 5 | 10 | 2 | 22 |
| Elmira, N. Y..... | 1 | 3 | ..... | 3 | 4 | 3 | 3 | 1 | 5 | 1 | 2 | 3 | 4 | 10 | 9 | 6 | 29 |
| Keokuk, Iowa..... | 1 | 2 | 1 | 2 | 6 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 10 | 8 | 9 | 31 |
| Bridgeport, Conn. | 3 | 3 | 2 | 5 | 2 | ..... | 1 | 3 | 2 | 5 | 3 | 5 | 8 | 7 | 6 | 13 | 34 |
| Terre Haute, Ind. | ..... | 3 | 2 | 10 | 2 | 5 | 1 | 3 | 1 | 1 | 2 | 4 | 5 | 17 | 5 | 7 | 34 |
| Oakland, Cal..... | 3 | 2 | 3 | 5 | 2 | 3 | 4 | 3 | 4 | 3 | 1 | 3 | 8 | 10 | 11 | 7 | 36 |
| Wheeling, W. Va. | 1 | 4 | 5 | 2 | 4 | 4 | 2 | 3 | 2 | 5 | 4 | 1 | 10 | 10 | 7 | 10 | 37 |
| Peoria, Ills..... | 3 | 5 | 1 | 2 | 3 | 5 | 1 | 6 | 3 | 4 | 1 | 3 | 9 | 10 | 10 | 8 | 37 |
| Augusta, Ga..... | 4 | 5 | 4 | 6 | ..... | 4 | 2 | 3 | 1 | 7 | 1 | 1 | 13 | 10 | 6 | 9 | 38 |
| Bangor, Me..... | 4 | 4 | 3 | 4 | 6 | 6 | 4 | 2 | 4 | 3 | 3 | 3 | 11 | 16 | 10 | 9 | 46 |
| Newburgh, N. Y.. | 2 | 2 | 6 | 7 | 6 | 7 | 1 | 6 | 1 | 4 | 2 | 3 | 10 | 20 | 8 | 9 | 47 |
| Utica, N. Y..... | 5 | 2 | 7 | 3 | 5 | 6 | 4 | 1 | 5 | 6 | 1 | 3 | 14 | 14 | 10 | 10 | 48 |
| Haverhill, Mass... | 4 | 4 | 5 | 1 | 6 | 8 | 2 | 3 | 4 | 7 | 6 | 1 | 13 | 15 | 9 | 14 | 51 |
| Po'keepsie, N. Y.. | 4 | 3 | 3 | 3 | 4 | 1 | 6 | 5 | 5 | 8 | 4 | 5 | 10 | 8 | 16 | 17 | 51 |
| Montgomery, Ala. | 1 | 3 | 2 | 14 | 5 | 4 | 4 | 3 | 5 | 1 | 5 | 6 | 6 | 23 | 12 | 12 | 53 |
| Newburyp't, Mass | 6 | 6 | 3 | 6 | 4 | 5 | 3 | 3 | 4 | 3 | 3 | 7 | 15 | 15 | 10 | 13 | 53 |
| Chelsea, Mass..... | 5 | 3 | 5 | 8 | 6 | 6 | 7 | 5 | 4 | 5 | 3 | 7 | 13 | 20 | 16 | 15 | 64 |

## TABLE IV.—Continued.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hartford, Conn... | 7 | 4 | 8 | 8 | 7 | 9 | 4 | 6 | 3 | 5 | 2 | 6 | 19 | 24 | 13 | 13 | 69 |
| Norfolk, Va..... | 4 | 5 | 6 | 8 | 5 | 6 | 3 | 5 | 8 | 6 | 6 | 7 | 15 | 19 | 16 | 19 | 69 |
| Springfield, Mass.. | 10 | 14 | 6 | 7 | 4 | 6 | 4 | 2 | 7 | 7 | 3 | 1 | 30 | 17 | 13 | 11 | 71 |
| St. Paul, Minn.... | 2 | 5 | 8 | 4 | 2 | 11 | 6 | 10 | 12 | 6 | 6 | 6 | 15 | 17 | 28 | 18 | 78 |
| Taunton, Mass..... | 6 | 11 | 6 | 12 | 4 | 11 | 5 | 5 | 2 | 6 | 5 | 5 | 23 | 27 | 12 | 16 | 78 |
| Dayton, O..... | 6 | 7 | 5 | 9 | 7 | 7 | 11 | 8 | 7 | 6 | 9 | 7 | 18 | 23 | 26 | 22 | 89 |
| Lynn, Mass..... | 11 | 14 | 5 | 6 | 8 | 9 | 8 | 6 | 5 | 8 | 13 | 9 | 30 | 23 | 19 | 30 | 102 |
| Salem, Mass..... | 11 | 7 | 6 | 5 | 8 | 11 | 7 | 6 | 13 | 10 | 10 | 10 | 24 | 24 | 26 | 30 | 104 |
| Lawrence, Mass... | 12 | 7 | 5 | 13 | 12 | 14 | 15 | 11 | 8 | 7 | 10 | 5 | 24 | 39 | 34 | 22 | 119 |
| Syracuse, N. Y.... | 11 | 8 | 12 | 11 | 14 | 15 | 7 | 9 | 10 | 8 | 6 | 10 | 31 | 40 | 26 | 24 | 121 |
| Patterson, N. J... | 10 | 14 | 6 | 14 | 17 | 12 | 8 | 13 | 12 | 9 | 9 | 4 | 30 | 43 | 33 | 22 | 128 |
| Milwaukee, Wis... | 18 | 9 | 13 | 10 | 5 | 11 | 14 | 11 | 9 | 10 | 11 | 15 | 40 | 26 | 34 | 36 | 136 |
| Mobile, Ala..... | 10 | 11 | 9 | 13 | 16 | 13 | 10 | 9 | 17 | 9 | 8 | 12 | 30 | 42 | 36 | 29 | 137 |
| Memphis, Tenn... | 9 | 11 | 10 | 14 | 10 | 9 | 14 | 12 | 13 | 7 | 15 | 17 | 30 | 33 | 39 | 39 | 141 |
| New Haven, Conn | 7 | 16 | 14 | 13 | 21 | 12 | 6 | 18 | 9 | 13 | 10 | 12 | 37 | 46 | 33 | 35 | 151 |
| Fall River, Mass.. | 14 | 13 | 12 | 14 | 18 | 18 | 9 | 11 | 11 | 15 | 16 | 11 | 39 | 50 | 31 | 42 | 162 |
| Portland, Me..... | 8 | 12 | 14 | 20 | 19 | 13 | 19 | 12 | 14 | 15 | 11 | 16 | 34 | 52 | 45 | 42 | 173 |
| Worcester, Mass.. | 8 | 17 | 13 | 19 | 10 | 20 | 12 | 10 | 20 | 18 | 21 | 20 | 38 | 49 | 42 | 59 | 188 |
| Charleston, S. C... | 20 | 15 | 11 | 17 | 18 | 19 | 22 | 25 | 8 | 12 | 11 | 15 | 46 | 54 | 55 | 38 | 193 |
| Lowell, Mass..... | 20 | 21 | 15 | 16 | 14 | 15 | 17 | 21 | 23 | 15 | 19 | 11 | 56 | 45 | 61 | 45 | 207 |
| Cleveland, O..... | 19 | 20 | 25 | 27 | 16 | 22 | 20 | 23 | 22 | 5 | 10 | 10 | 64 | 65 | 65 | 25 | 219 |
| Providence, R. I... | 18 | 27 | 14 | 20 | 26 | 19 | 19 | 15 | 13 | 19 | 18 | 13 | 59 | 65 | 47 | 60 | 231 |
| Richmond, Va..... | 24 | 21 | 22 | 30 | 15 | 19 | 16 | 32 | 13 | 10 | 18 | 19 | 67 | 64 | 61 | 47 | 239 |
| Buffalo, N. Y..... | 17 | 24 | 21 | 18 | 22 | 24 | 23 | 18 | 24 | 15 | 25 | 12 | 62 | 64 | 65 | 52 | 243 |
| Dist. of Columbia. | 26 | 29 | 27 | 22 | 24 | 32 | 19 | 18 | 21 | 30 | 23 | 21 | 82 | 78 | 58 | 74 | 292 |

## TABLE IV.—Concluded.

*Deaths from Phthisis, according to Months and Seasons, in 56 Cities.*

| CITIES. | Dec. | Jan. | Feb. | Mar. | Apl. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Winter | Spring. | Summer | Fall. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pittsburg, Pa..... | 23 | 26 | 24 | 27 | 36 | 25 | 27 | 34 | 24 | 22 | 27 | 31 | 73 | 88 | 85 | 80 | 326 |
| Louisville, Ky..... | 35 | 28 | 32 | 48 | 46 | 33 | 26 | 29 | 24 | 23 | 14 | 20 | 95 | 127 | 79 | 57 | 358 |
| Newark, N. J..... | 40 | 42 | 37 | 51 | 28 | 24 | 22 | 18 | 25 | 40 | 62 | 45 | 119 | 103 | 65 | 147 | 434 |
| Chicago, Ills..... | 58 | 50 | 58 | 60 | 63 | 52 | 49 | 41 | 51 | 48 | 53 | 56 | 166 | 175 | 141 | 157 | 639 |
| Cincinnati, O..... | 48 | 46 | 68 | 70 | 56 | 64 | 47 | 64 | 46 | 45 | 54 | 49 | 162 | 190 | 157 | 148 | 657 |
| St. Louis, Mo..... | 69 | 62 | 64 | 82 | 72 | 70 | 57 | 43 | 63 | 57 | 52 | 60 | 195 | 224 | 163 | 169 | 751 |
| New Orleans, La.. | 72 | 90 | 58 | 66 | 68 | 73 | 58 | 88 | 64 | 67 | 89 | 57 | 220 | 207 | 210 | 213 | 850 |
| Baltimore, Md..... | 88 | 74 | 94 | 140 | 89 | 86 | 100 | 83 | 85 | 112 | 80 | 77 | 256 | 315 | 268 | 269 | 1108 |
| Boston, Mass..... | 101 | 128 | 77 | 125 | 101 | 106 | 86 | 103 | 92 | 93 | 81 | 101 | 306 | 332 | 281 | 275 | 1194 |
| Philadelphia, Pa.. | 133 | 227 | 243 | 258 | 175 | 185 | 181 | 195 | 142 | 150 | 220 | 184 | 602 | 618 | 518 | 554 | 2292 |
| New York, N. Y.. | 339 | 373 | 364 | 405 | 385 | 377 | 301 | 294 | 306 | 330 | 324 | 326 | 1076 | 1167 | 901 | 990 | 4134 |
| Total..... | 1366 | 1550 | 1469 | 1772 | 1509 | 1527 | 1310 | 1366 | 1281 | 1327 | 1396 | 1364 | 4385 | 4808 | 3957 | 4087 | 17237 |
| Percentage..... | 7.92 | 8.99 | 8.52 | 10.28 | 8.75 | 8.85 | 7.59 | 7.92 | 7.43 | 7.69 | 8.09 | 7.91 | 25.43 | 27.89 | 22.95 | 23.71 | |

Of all the seasons, spring shows the largest mortality, so that it exceeds even its colder predecessor, the winter, by nearly 2½ per cent. This result is elicited from all data of American origin, and it increases with the increase of the numbers upon which the calculations are based (see notes to Table V.). Summer represents the most favorable results, yet there is a difference of scarcely one per cent. between it and autumn.

As far as the single months are concerned, March is the most dangerous, and next in a descending order follow January, May, April, February, and December. With exception of the last named month we find the same order in Table V. in the total of both sexes. The most favorable months are September, June, and August, the latter having the lowest death-rate.

The greatest mortality occurs in 48 cities 8 times in winter, 27 times in spring, 9 times in summer, and 4 times in autumn. In 7 cities the maximum occurs in 2, in 1 city in 3 seasons, viz: 4 times in winter, 6 times in spring, 3 times in summer, and 4 times in autumn. In view of the double seasons, the maximum of the death-rate equals in winter 18.4, in spring 50.7, in summer 18.4, and in autumn 12.3 per cent. Moreover, in 30 cities with 100 or more deaths, the maximum falls in 18 (or 60 per cent.) upon spring; among 11 cities with 300 deaths and more, it falls in 8 (or 81 per cent.) upon spring. Hence we observe that in deducting from large figures, which exclude mere accidentals, the immense mortality of spring becomes more and more evident.

## TABLE V.

Sex and month of death are only mentioned in the reports of Boston and Philadelphia. Therefore I added the New York report of 1872, and a table covering eleven years contained in the Philadelphia report. By this means

I obtained the large number of 15,000 deaths for each sex, distributed over the single months. If we add the foregoing table, we have nearly 48,000 deaths, on the registration of which we can rely. The data of the United States Census being in perfect accordance with my own deductions, have not again been enumerated in this table, so as not to fatigue by the frequent recurrence of great numbers, but they will be considered in the text. Owing to a discrepancy in the results, I have drawn the information relating to fifteen German life insurance companies from Oldendorff's article.

# TABLE V.

*Deaths from Phthisis according to Months, Seasons and Sex, in Boston,* 1873; *New York,* 1872; *Philadelphia,* 1862 *to* 1873; *and* 15 *Life Insurance Companies of Germany.*

| CITIES AND SEX. | Dec. | Jan. | Feb. | Mar. | Apl. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Winter | Spring. | Summer | Fall. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Male.* | | | | | | | | | | | | | | | | | |
| Boston, 1873.... | 46 | 64 | 51 | 61 | 56 | 50 | 35 | 48 | 40 | 37 | 26 | 54 | 161 | 167 | 123 | 117 | 568 |
| New York, 1872 | 184 | 165 | 201 | 257 | 176 | 177 | 183 | 159 | 192 | 148 | 158 | 176 | 550 | 610 | 534 | 482 | 2176 |
| Philadelphia,'62 | 92 | 93 | 93 | 77 | 98 | 99 | 68 | 68 | 77 | 46 | 92 | 58 | 278 | 274 | 213 | 196 | 961 |
| " 1863 | 95 | 90 | 77 | 75 | 104 | 79 | 61 | 86 | 75 | 77 | 62 | 85 | 262 | 258 | 222 | 224 | 966 |
| " 1864 | 96 | 95 | 97 | 111 | 144 | 124 | 78 | 67 | 83 | 70 | 89 | 83 | 288 | 379 | 228 | 242 | 1137 |
| " 1865 | 85 | 96 | 113 | 115 | 80 | 81 | 89 | 84 | 64 | 64 | 62 | 87 | 294 | 276 | 237 | 213 | 1020 |
| " 1866 | 78 | 110 | 88 | 86 | 66 | 108 | 82 | 50 | 92 | 63 | 106 | 65 | 276 | 260 | 224 | 234 | 994 |
| " 1867 | 69 | 113 | 87 | 97 | 73 | 107 | 65 | 76 | 51 | 59 | 83 | 62 | 269 | 277 | 192 | 204 | 942 |
| " 1868 | 87 | 110 | 90 | 96 | 130 | 78 | 86 | 64 | 61 | 58 | 70 | 70 | 287 | 304 | 211 | 198 | 1000 |
| " 1869 | 74 | 86 | 86 | 106 | 107 | 77 | 79 | 73 | 80 | 59 | 73 | 82 | 246 | 290 | 232 | 214 | 982 |
| " 1870 | 93 | 89 | 102 | 129 | 112 | 126 | 78 | 73 | 77 | 64 | 72 | 103 | 284 | 367 | 228 | 239 | 1118 |
| " 1871 | 84 | 84 | 104 | 140 | 94 | 85 | 89 | 90 | 81 | 97 | 82 | 69 | 272 | 319 | 260 | 248 | 1099 |
| " 1872 | 73 | 128 | 106 | 95 | 124 | 113 | 80 | 98 | 85 | 80 | 98 | 87 | 307 | 332 | 263 | 265 | 1167 |
| " 1873 | 59 | 104 | 127 | 138 | 90 | 95 | 78 | 92 | 55 | 73 | 96 | 86 | 290 | 323 | 225 | 255 | 1093 |
| *Female.* | | | | | | | | | | | | | | | | | |
| Boston, 1873.... | 55 | 64 | 26 | 64 | 45 | 56 | 51 | 55 | 52 | 56 | 55 | 47 | 145 | 165 | 158 | 158 | 626 |
| New York, 1872 | 189 | 128 | 174 | 230 | 172 | 151 | 189 | 156 | 202 | 147 | 152 | 208 | 491 | 553 | 547 | 507 | 2098 |

## TABLE V.—Continued.

*Deaths from Phthisis, according to Months, Seasons and Sex, in Boston,* 1873; *New York,* 1872; *Philadelphia,* 1862 *to* 1873; *and* 15 *Life Insurance Companies of Germany.*

| CITIES AND SEX. | Dec. | Jan. | Feb. | Mar. | Apl. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Winter | Spring. | Summer | Fall. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Philadelphia,'62 | 72 | 91 | 85 | 102 | 70 | 127 | 57 | 76 | 68 | 71 | 85 | 84 | 248 | 299 | 201 | 240 | 988 |
| " 1863 | 102 | 74 | 87 | 85 | 105 | 67 | 60 | 85 | 80 | 79 | 88 | 77 | 263 | 257 | 225 | 244 | 989 |
| " 1864 | 107 | 94 | 68 | 119 | 32 | 106 | 75 | 53 | 85 | 69 | 74 | 70 | 269 | 257 | 213 | 213 | 952 |
| " 1865 | 79 | 75 | 83 | 125 | 96 | 79 | 90 | 63 | 83 | 57 | 65 | 111 | 237 | 300 | 236 | 233 | 1006 |
| " 1866 | 68 | 107 | 90 | 80 | 79 | 83 | 71 | 66 | 89 | 65 | 79 | 73 | 265 | 242 | 226 | 217 | 950 |
| " 1867 | 72 | 111 | 82 | 96 | 86 | 109 | 67 | 97 | 53 | 68 | 91 | 83 | 265 | 291 | 217 | 232 | 1005 |
| " 1868 | 84 | 104 | 91 | 74 | 119 | 71 | 76 | 66 | 85 | 82 | 65 | 78 | 279 | 264 | 227 | 225 | 995 |
| " 1869 | 99 | 80 | 99 | 109 | 80 | 67 | 90 | 71 | 91 | 64 | 59 | 84 | 278 | 256 | 252 | 207 | 993 |
| " 1870 | 87 | 111 | 95 | 134 | 94 | 122 | 78 | 106 | 100 | 71 | 81 | 111 | 293 | 350 | 284 | 263 | 1190 |
| " 1871 | 101 | 90 | 101 | 119 | 113 | 103 | 58 | 78 | 123 | 74 | 99 | 80 | 290 | 335 | 259 | 253 | 1139 |
| " 1872 | 71 | 118 | 103 | 113 | 107 | 122 | 83 | 98 | 85 | 73 | 108 | 82 | 292 | 342 | 266 | 263 | 1163 |
| " 1873 | 73 | 123 | 116 | 120 | 85 | 90 | 103 | 103 | 87 | 77 | 124 | 98 | 312 | 295 | 293 | 299 | 1199 |
| Total—Male..... | 1215 | 1427 | 1422 | 1583 | 1454 | 1399 | 1151 | 1128 | 1113 | 995 | 1169 | 1169 | 4064 | 4436 | 3392 | 3331 | 15223 |
| " Female.. | 1259 | 1370 | 1300 | 1570 | 1283 | 1353 | 1148 | 1173 | 1283 | 1053 | 1225 | 1276 | 3929 | 4206 | 3604 | 3554 | 15293 |
| Per ct.—Male... | 7.98 | 9.37 | 9.34 | 10.40 | 9.55 | 9.19 | 7.56 | 7.40 | 7.31 | 6.53 | 7.67 | 7.66 | 26.69 | 29.14 | 22.28 | 21.88 | |
| " Female | 8.23 | 8.95 | 8.50 | 10.26 | 8.38 | 8.84 | 7.50 | 7.67 | 8.38 | 6.88 | 8.01 | 8.34 | 25.69 | 27.48 | 23.56 | 23.23 | |

## TABLE V.—Concluded.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grand Total..... | 2474 | 2797 | 2722 | 3153 | 2737 | 2752 | 2299 | 2301 | 2396 | 2048 | 2394 | 2443 | 7993 | 8642 | 6996 | 6885 | 30516 |
| Percentage..... | 8.10 | 9.16 | 8.91 | 10.33 | 8.96 | 9.01 | 7.53 | 7.54 | 7.85 | 6.71 | 7.84 | 8.01 | 26.19 | 28.31 | 22.92 | 22.56 | |
| 15 *German Co's.* | | | | | | | | | | | | | | | | | |
| Male ..... ... | 52 | 68 | 57 | 79 | 52 | 73 | 60 | 53 | 27 | 50 | 29 | 51 | 177 | 204 | 140 | 130 | 651 |
| Female..... | 10 | 11 | 15 | 6 | 7 | 12 | 9 | 13 | 9 | 11 | 8 | 12 | 36 | 25 | 31 | 31 | 123 |
| Per ct.—Male... | 7.99 | 10.45 | 8.75 | 12.14 | 7.99 | 11.21 | 9.21 | 8.14 | 4.15 | 7.68 | 4.46 | 7.83 | 27.19 | 31.34 | 21.50 | 19.97 | |
| " Female | 8.13 | 8.94 | 12.20 | 4.88 | 5.69 | 9.76 | 7.31 | 10.57 | 7.32 | 8.94 | 6.50 | 9.76 | 29.27 | 20.33 | 25.20 | 25.20 | |
| Total ..... | 62 | 79 | 72 | 85 | 59 | 85 | 69 | 66 | 36 | 61 | 37 | 63 | 213 | 229 | 171 | 161 | 774 |
| Percentage ..... | 8.01 | 10.21 | 9.30 | 10.98 | 7.63 | 10.98 | 8.91 | 8.53 | 4.65 | 7.88 | 4.78 | 8.14 | 27.52 | 29.59 | 22.09 | 20.80 | |

When we proceed to investigate the relative proportions of the sexes, we obtain, in opposition to Oldendorff, a perfect uniformity regarding the fatality of the seasons, except that the difference is somewhat more strongly expressed with the male than the female sex. The U. S. Census gives the same order; spring being the most dangerous, then winter, summer, and autumn, this order holding good for individual sexes as well as the sum total. The only exception is, that in the census the male mortality in autumn is 0.28 per cent. in excess of that for summer. Whilst thus the seasons show no difference in general, a small incongruence is seen from a comparison of the first quarter's deaths of the two sexes. While here too, the death-rate of males is smaller than in spring, that of females is 0.23 per cent. greater; in this way influencing the total result, which shows 0.09 per cent. more of mortality for the first quarter than for spring. This result, however, is not found anywhere else, neither in Table IV., nor in the census; neither in the total result, nor with one of the sexes.

The maximum during successive years occurs in the male sex ten times in spring, with 414 deaths over those in winter, and four times in winter with 42 deaths in excess of those in spring. With the female sex the maximum occurs eight times in spring, with 372 deaths over those in winter, and six times in winter with 95 deaths in excess of those in spring. March and September are equally marked for both sexes, both for their highest as well as lowest mortality.

In regard to the sum total without reference to sex, the greatest mortality occurs only during the two years 1863 and 1866 in Philadelphia in winter, and in all other cases in spring. The most dangerous five months are the same as in Table IV., and follow in the same order, the healthiest being July, June, September, the latter with the lowest death-rate. The total result of the U. S. Census is not

quite in agreement with this succession, the largest death-rate being recorded for May, followed by March (however with only 0.12 per cent. smaller mortality), then April, February; June exhibits the lowest death-rate, and the fact that the lowest and the highest numbers come in such immediate proximity in the census ought to invite careful examination before we accept the conclusion. My own data, extending over nearly 48,000 deaths, show on Table IV. a space of four and on Table V. of five months between the highest and lowest rates, and I believe that these facts come the nearest to actual truth. I beg to direct attention to the fact elicited in a comparison of Tables IV. and V. with the U. S. Census. It proves, for American sources at least, that the greater the numbers we deal with the greater an increase is shown in the mortality of spring. The 17,237 deaths of the 4th table yield 27.89, the 30,516 of the present one 28.31, and the 69,896 of the Census (minus 20 dying in unknown months), with 22,839 deaths, 32.68 per cent. for the season in question. How far we are justified to ascribe to facts this high rate of spring mortality is a subject on which I shall more fully dwell in the notes to Table VII. The difference between Oldendorff's conclusions and my own shall be treated on in the next table.

## TABLE VI.

This table has been formed for the purpose of comparison with Oldendorff's, and permitted only the use of the New York report, where deaths from Phthisis are classified in this manner. I deem it judicious to insert it on the ground that, contrary to other assertions, the independence of spring mortality from age and sex is set forth, and that moreover the requisite data are so rarely recorded as to offer but few opportunities for ready comparison.

# TABLE VI.

*Deaths from Phthisis, according to Months, Seasons, Sex and Age, in New York in* 1872, *and* 15 *Life Insurance Companies of Germany.*

| AGE AND SEX. | Dec. | Jan. | Feb. | Mar. | Apl. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Winter | Spring. | Summer | Fall. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *New York,* '72. | | | | | | | | | | | | | | | | | |
| Under 45 yrs. | | | | | | | | | | | | | | | | | |
| Male..... | 129 | 120 | 146 | 200 | 124 | 132 | 146 | 110 | 142 | 116 | 113 | 124 | 395 | 456 | 398 | 353 | 1602 |
| Female... | 147 | 97 | 134 | 172 | 119 | 112 | 145 | 120 | 159 | 110 | 121 | 153 | 378 | 403 | 424 | 384 | 1589 |
| Total..... | 276 | 217 | 280 | 372 | 243 | 244 | 291 | 230 | 301 | 226 | 234 | 277 | 773 | 859 | 822 | 737 | 3191 |
| Over 45 yrs. | | | | | | | | | | | | | | | | | |
| Male..... | 55 | 45 | 55 | 57 | 52 | 45 | 37 | 49 | 50 | 32 | 45 | 52 | 155 | 154 | 136 | 129 | 574 |
| Female.... | 42 | 31 | 40 | 58 | 53 | 39 | 44 | 36 | 43 | 37 | 31 | 55 | 113 | 150 | 123 | 123 | 509 |
| Total..... | 97 | 76 | 95 | 115 | 105 | 84 | 81 | 85 | 93 | 69 | 76 | 107 | 268 | 304 | 259 | 252 | 1083 |
| *Percentage.* | | | | | | | | | | | | | | | | | |
| Under 45 yrs. | | | | | | | | | | | | | | | | | |
| Male..... | 8.05 | 7.49 | 9.11 | 12.48 | 7.74 | 8.23 | 9.11 | 6.86 | 8.86 | 7.24 | 7.05 | 7.74 | 24.65 | 28.46 | 24.84 | 22.03 | |
| Female.... | 9.25 | 6.10 | 8.43 | 10.82 | 7.48 | 7.04 | 9.12 | 7.55 | 10.00 | 6.92 | 7.61 | 9.62 | 23.78 | 25.36 | 26.68 | 24.16 | |
| Total..... | 8.64 | 6.80 | 8.77 | 11.64 | 7.61 | 7.64 | 9.11 | 7.20 | 9.43 | 7.08 | 7.33 | 8.68 | 24.22 | 26.91 | 25.75 | 23.09 | |
| Over 45 yrs. | | | | | | | | | | | | | | | | | |
| Male..... | 9.58 | 7 83 | 9.58 | 9.93 | 9.05 | 7.83 | 6.44 | 8.53 | 8.71 | 5.57 | 7.83 | 9.05 | 27.00 | 26.82 | 23.69 | 22.48 | |
| Female.... | 8.25 | 6.09 | 7.85 | 11.39 | 10.41 | 7.66 | 8 64 | 7.07 | 8.44 | 7.24 | 6.09 | 10.80 | 22.20 | 29.46 | 24.16 | 24.16 | |
| Total..... | 8.95 | 7.01 | 8.77 | 10.61 | 9.69 | 7.75 | 7.47 | 7.84 | 8.58 | 6.37 | 7.01 | 9.87 | 24.74 | 28.07 | 23.91 | 23.26 | |

## TABLE VI.—Concluded.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 *Germ'n Co's* | | | | | | | | | | | | | | | | | |
| Under 45 yrs. | | | | | | | | | | | | | | | | | |
| Male..... | 30 | 42 | 30 | 50 | 40 | 56 | 43 | 33 | 18 | 29 | 18 | 33 | 102 | 146 | 94 | 80 | 422 |
| Female.... | 8 | 7 | 11 | 4 | 7 | 10 | 8 | 13 | 6 | 6 | 4 | 11 | 26 | 21 | 27 | 21 | 95 |
| Total ..... | 38 | 49 | 41 | 54 | 47 | 66 | 51 | 46 | 24 | 35 | 22 | 44 | 128 | 167 | 121 | 101 | 517 |
| Over 45 yrs. | | | | | | | | | | | | | | | | | |
| Male..... | 22 | 26 | 27 | 29 | 12 | 17 | 17 | 20 | 9 | 21 | 11 | 18 | 75 | 58 | 46 | 50 | 229 |
| Female.... | 2 | 4 | 4 | 2 | ..... | 2 | 1 | ..... | 3 | 5 | 4 | 1 | 10 | 4 | 4 | 10 | 28 |
| Total..... | 24 | 30 | 31 | 31 | 12 | 19 | 18 | 20 | 12 | 26 | 15 | 19 | 85 | 62 | 50 | 60 | 257 |
| *Percentage.* | | | | | | | | | | | | | | | | | |
| Under 45 yrs. | | | | | | | | | | | | | | | | | |
| Male..... | 7.11 | 9.95 | 7.11 | 11.85 | 9.48 | 13.27 | 10.19 | 7.82 | 4.26 | 6.88 | 4.26 | 7.82 | 24.17 | 34.60 | 22.27 | 18.96 | |
| Female.... | 8.42 | 7.36 | 11.58 | 4.21 | 7.37 | 10.53 | 8.42 | 13.68 | 6.32 | 6.32 | 4.21 | 11.58 | 27.36 | 22.11 | 28.42 | 22.11 | |
| Total..... | 7.35 | 9.48 | 7.93 | 10.44 | 9.09 | 12.77 | 9.86 | 8.90 | 4.64 | 6.77 | 4.26 | 8.51 | 24.76 | 32.30 | 23.40 | 19.54 | |
| Over 45 yrs. | | | | | | | | | | | | | | | | | |
| Male..... | 9.61 | 11.35 | 11.79 | 12.66 | 5.24 | 7.42 | 7.42 | 8.74 | 3.93 | 9.17 | 4.81 | 7.86 | 32.75 | 25.32 | 20.09 | 21.84 | |
| Female.... | 7.14 | 14.29 | 14.29 | 7.14 | ..... | 7.14 | 3.57 | ..... | 10.71 | 17.86 | 14.29 | 3.57 | 35.72 | 14.28 | 14.28 | 35.72 | |
| Total..... | 9.34 | 11.68 | 12.06 | 12.06 | 4.67 | 7.39 | 7.00 | 7.78 | 4.67 | 10.12 | 5.84 | 7.39 | 33.08 | 24.12 | 19.45 | 23.35 | |

In Table V. Oldendorff finds the highest mortality for females in winter, and in Table VI. he asserts the same for all ages beyond forty-five years. Regarding the female death-rate from all causes (566) in the companies, he finds the same ratios: 26.68 per cent. in winter and 23.85 in spring. The result of our tables is not in accordance herewith; as for the two specified seasons at least they closely adhere to the laws deduced from all our data. Only in the one case of the male death-rate of over forty-five years, the one death produces an excess of 0.18 per cent. in favor of winter over spring. Surprising, however, is in the entire group of deaths under forty-five years the preponderance of mortality during summer over that in winter. As far as the single months are concerned the maximum with us invariably occurs in March, whilst the minimum extends over February, June, July, September and October. The discrepancy is most readily explained when we bear in mind that the data at my command are nearly six times as extensive for this table, and 124 times as extensive for the female death-rate of the last table, thus affording a greater chance for excluding accidentals. But even in case the numbers of this table should show a divergence from the total result, I should not consider them sufficiently large to permit any inference as to a different distribution of deaths. As moreover Oldendorff finds that female deaths from all causes predominate in winter, adducing also other authorities to bear upon this point, I have calculated the deaths from all causes in the census for separate quarters, and found that with due consideration of 209 male and 136 female deaths in unknown months, there died:

| | | | | |
|---|---|---|---|---|
| Males in winter | 62,600, | spring 75.237, | summer 63,744, | autumn 58,883. |
| Females " | 54,854, " | 67,560, " | 56,867, " | 52,173. |
| Total, " | 117,454, " | 142,797, " | 120,611, " | 111,056. |

According to this the seasons take a uniform order for both sexes, as well as for the total result: spring, summer,

winter, autumn. No difference as to the sexes can here be traced, and the figures are too extensive as to give room for any doubt. The preponderance of mortality in summer over that in winter, is in a great measure due to the well-known large infant mortality during the former season.

## TABLE VII.

Among the fifty-six cities of the 4th table 23 have Signal offices of the U. S. A. The data of this table are collected from the Chief Signal Office in Washington. The table presents three columns, the first showing the number of deaths in the single months and seasons (the same as in Table IV.), the second, the mean temperature for the same seasons, and the third, the amount of rainfall in inches. I much regret that I cannot furnish a more extensive material. Having applied to every station, I obtained the number of deaths for single months only from those named. I was earnestly desirous to have availed myself of that most important factor, the relative humidity of the air; but unfortunately these data could only be obtained for the last six months of the year 1873. Before that time it had been customary, when the usual observations were made three times a day, to note the condition of the dry and wet bulb, without making a calculation of the relative humidity. Since comparative observations extending over six months only cannot prove satisfactory in any respect, they were altogether omitted, and it must be left to future efforts to supply the deficiency.

# TABLE VII.

*Deaths from Phthisis according to Months and Seasons, with corresponding reference to Temperature and Rainfall in 23 Cities.*

| CITIES. | Dec. | Jan. | Feb. | Mar. | Apl. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Winter | Spring. | Sum'er. | Fall. | Total. | Deaths per 1000. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buffalo— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 17 | 24 | 21 | 18 | 22 | 24 | 23 | 18 | 24 | 15 | 25 | 12 | 62 | 64 | 65 | 52 | 243 | 1.42 |
| Temperat'e | 31.9 | 24.8 | 26. | 31.2 | 42. | 54.5 | 67.5 | 69.5 | 67.2 | 59.3 | 48.5 | 30.6 | 27.5 | 42.5 | 68. | 46.1 | 46. | |
| Rainfall..... | 4.56 | 1.68 | 1.42 | 5.52 | 3.58 | 2.52 | 1.77 | 7.19 | 3.46 | 2.60 | 6.34 | 3.89 | 7.66 | 11.62 | 12.42 | 12.83 | 44.53 | |
| Chicago— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 58 | 50 | 58 | 60 | 63 | 52 | 49 | 41 | 51 | 48 | 53 | 56 | 166 | 175 | 141 | 157 | 639 | 1.59 |
| Temperat'e | 32.4 | 20.7 | 24.6 | 34.6 | 42.3 | 53.9 | 70.2 | 71.2 | 71.7 | 62.4 | 49.1 | 34.4 | 25.9 | 43.6 | 71. | 48.6 | 47.29 | |
| Rainfall..... | 4.44 | 2.56 | .47 | .89 | 6.12 | 7.20 | 1.44 | 4.04 | 1.58 | 2.53 | 2.43 | 1.61 | 7.47 | 14.21 | 7.06 | 6.57 | 35.31 | |
| Cleveland— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 19 | 20 | 25 | 27 | 16 | 22 | 20 | 23 | 22 | 5 | 10 | 10 | 64 | 65 | 65 | 25 | 219 | 1.59 |
| Temperat'e | 36.7 | 24. | 26.9 | 32.9 | 44.8 | 57.3 | 70.2 | 71.9 | 70.6 | 63.2 | 51.2 | 36.6 | 29.2 | 45. | 70.9 | 50.3 | 48.8 | |
| Rainfall..... | 5.50 | 2.41 | 1.94 | 3.24 | 5.38 | 3.11 | 5.50 | 4.82 | 1.87 | 2.44 | 3.38 | 1.65 | 9.85 | 12.73 | 12.19 | 7.47 | 41.24 | |
| St. Louis— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 69 | 62 | 64 | 82 | 72 | 70 | 57 | 43 | 63 | 57 | 52 | 60 | 195 | 224 | 163 | 169 | 751 | 1.66 |
| Temperat'e | 37.2 | 26. | 33.6 | 42.6 | 51.2 | 65.1 | 77.1 | 77.5 | 78.5 | 66.6 | 52.3 | 41.8 | 32.2 | 52.9 | 77.7 | 53.5 | 54.1 | |
| Rainfall..... | 5.10 | 3.53 | 1.52 | 2.10 | 6.86 | 5.27 | 6.68 | 5.96 | 0.07 | 3.02 | 3.27 | 1.64 | 10.15 | 14.23 | 12.71 | 7.93 | 45.02 | |
| Augusta— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 4 | 5 | 4 | 6 | ..... | 4 | 2 | 3 | 1 | 7 | 1 | 1 | 13 | 10 | 6 | 9 | 38 | 1.9 |
| Temperat'e | 48.1 | 44.8 | 49.9 | 52.3 | 64.2 | 72.4 | 78.6 | 80.8 | 78.8 | 74.4 | 60.7 | 51.5 | 34.2 | 62.9 | 79.7 | 62.2 | 63.4 | |
| Rainfall..... | 2.66 | 5.03 | 4.16 | 3.65 | 2. | 8.63 | 3.12 | 3.34 | 5.36 | 3.27 | 2.58 | 4.70 | 11.85 | 14.28 | 11.82 | 10.55 | 48.50 | |

## TABLE VII.—Continued.

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Milwaukee— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 18 | 9 | 13 | 10 | 5 | 11 | 14 | 11 | 9 | 10 | 11 | 15 | 40 | 26 | 34 | 36 | 136 | 1.93 |
| Temperat'e | 29.6 | 16.8 | 21. | 32.2 | 38.9 | 49.7 | 66.9 | 68.1 | 70.5 | 59.8 | 46.4 | 30.9 | 22.4 | 40 2 | 68.5 | 45.7 | 44.2 | |
| Rainfall..... | 2.81 | 2.81 | .17 | 1.22 | 2.30 | 5.17 | 2.88 | 2.69 | 4.01 | 2.87 | 1.96 | 1.72 | 5.79 | 8.69 | 9.58 | 6.55 | 30.61 | |
| Dis. of Col.— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 26 | 29 | 27 | 22 | 24 | 32 | 19 | 18 | 21 | 30 | 23 | 21 | 82 | 78 | 58 | 74 | 292 | 1.94 |
| Temperat'e | 31. | 31.7 | 31.1 | 41.5 | 53.3 | 63.6 | 76.5 | 80.3 | 74.9 | 68.3 | 55.8 | 42.2 | 31.2 | 52.8 | 77.2 | 55.4 | 54.18 | |
| Rainfall..... | 2.49 | 3.73 | 4.69 | 3.03 | 3.19 | 5.21 | 1.63 | 4.30 | 6.83 | 3.48 | 4.83 | 2.75 | 10.91 | 11.43 | 12.76 | 11.06 | 46.16 | |
| Keokuk— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 1 | 2 | 1 | 2 | 6 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 10 | 8 | 9 | 31 | 2.06 |
| Temperat'e | 32. | 17.6 | 26.1 | 38.7 | 48.5 | 61.5 | 77.9 | 76.3 | 78.7 | 63.8 | 49.8 | 38.9 | 25.2 | 49.5 | 77.6 | 50.8 | 50.8 | |
| Rainfall..... | 8.56 | 3.31 | .53 | .51 | 5.65 | 3.42 | 1.21 | 8.77 | .54 | 3.37 | 4.69 | 1.43 | 12.40 | 9.58 | 10.52 | 9.49 | 41.99 | |
| Louisville— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 35 | 28 | 32 | 48 | 46 | 33 | 26 | 29 | 24 | 23 | 14 | 20 | 95 | 127 | 79 | 57 | 358 | 2.15 |
| Temperat'e | 38.7 | 31.1 | 36.8 | 43.3 | 54.6 | 67. | 78. | 79. | 78. | 69.5 | 54. | 41.5 | 35.5 | 54.9 | 78.3 | 55. | 55.9 | |
| Rainfall..... | 6.99 | 2.93 | 5.42 | 3.39 | 3.05 | 5.73 | 3.87 | 3.43 | 3.04 | 2.50 | 3.26 | 2.19 | 15.34 | 12.17 | 10.34 | 7.95 | 45.80 | |
| St. Paul— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 2 | 5 | 8 | 4 | 2 | 11 | 6 | 10 | 12 | 6 | 6 | 6 | 15 | 17 | 28 | 18 | 78 | 2.22 |
| Temperat'e | 18.6 | 6.7 | 14.3 | 26.7 | 41.9 | 55.1 | 73. | 71. | 70.7 | 54.1 | 41.3 | 25.6 | 13.2 | 41.2 | 71.5 | 40.3 | 41.58 | |
| Rainfall..... | .38 | 1.31 | 1.54 | 1.34 | 2.44 | 4.63 | 7.74 | 3.83 | 4.61 | 2.56 | 2.57 | .79 | 3.23 | 8.41 | 16.18 | 5.92 | 33.74 | |
| Pittsburgh— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 23 | 26 | 24 | 27 | 36 | 25 | 17 | 34 | 24 | 22 | 27 | 31 | 73 | 88 | 85 | 80 | 326 | 2.45 |
| Temperat'e | 37.1 | 29. | 29. | 36. | 48. | 61. | 72. | 74. | 71.9 | 63.6 | 57.3 | 35.8 | 31.7 | 48.3 | 72.6 | 52.2 | 51.2 | |
| Rainfall..... | 3.71 | 3.16 | 3.08 | 3.87 | 3.01 | 3.21 | 2.15 | 3.44 | 5.19 | 1.94 | 6.21 | 1.72 | 9.95 | 10.09 | 10.78 | 9.87 | 40.69 | |

TABLE VII.—Continued.

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cincinnati— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 48 | 46 | 68 | 70 | 56 | 64 | 47 | 64 | 46 | 45 | 54 | 49 | 162 | 190 | 157 | 148 | 657 | 2.66 |
| Temperat'e | 40.6 | 31.1 | 35.9 | 41.9 | 53.9 | 66.5 | 77.8 | 77.6 | 76.3 | 67.6 | 53.3 | 40.9 | 35.8 | 54.1 | 77.2 | 53.9 | 55.28 | |
| Rainfall..... | 6.47 | 2.66 | 3.76 | 2.36 | 2.89 | 3.50 | 3.58 | 3.94 | 4.69 | 2.24 | 2.79 | 2.50 | 12.89 | 8.75 | 12.21 | 7.53 | 41.38 | |
| Memphis— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 9 | 11 | 10 | 14 | 10 | 9 | 14 | 12 | 13 | 7 | 15 | 17 | 30 | 33 | 39 | 39 | 141 | 2.82 |
| Temperat'e | 44. | 45. | 45. | 53. | 55. | 72.4 | 81. | 78. | 79. | 71. | 56. | 49. | 44 6 | 60.1 | 79.3 | 58.6 | 60.6 | |
| Rainfall..... | 3.18 | 2.88 | 4.10 | 6.61 | 10.16 | .63 | 2.22 | .82 | 4.53 | 3.53 | 5.95 | 3.87 | 10.16 | 17.40 | 7.57 | 13.35 | 48.48 | |
| New Haven— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 7 | 16 | 14 | 13 | 21 | 12 | 6 | 18 | 9 | 13 | 10 | 12 | 37 | 46 | 33 | 35 | 151 | 2.97 |
| Temperat'e | 32.6 | 24.7 | 26.9 | 33.2 | 44.2 | 55.9 | 67. | 72.3 | 69. | 62.7 | 52.7 | 34. | 28. | 44.4 | 69.4 | 49.8 | 47.9 | |
| Rainfall..... | 4.44 | 7.55 | 3.49 | 4.05 | 5.79 | 6.27 | 2.07 | 1.55 | 9.90 | 2.12 | 7.18 | 4.75 | 15.48 | 16.11 | 13.52 | 14.05 | 59.16 | |
| Philadelphia, | | | | | | | | | | | | | | | | | | |
| Deaths..... | 132 | 227 | 243 | 258 | 175 | 185 | 181 | 195 | 142 | 150 | 220 | 184 | 602 | 618 | 518 | 554 | 2292 | 3.05 |
| Temperat'e | 38.3 | 28.9 | 29.8 | 37.1 | 45.3 | 59.6 | 70.6 | 76.4 | 72.3 | 66.1 | 54.7 | 38.3 | 32.3 | 47.3 | 73.1 | 53. | 51.4 | |
| Rainfall..... | 1.38 | 5.84 | 4.75 | 2.04 | 3.51 | 5.83 | .90 | 5. | 11.49 | 3.58 | 5.20 | 5.10 | 11.97 | 11.38 | 17.39 | 13.88 | 54.62 | |
| Norfolk— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 4 | 5 | 6 | 8 | 5 | 6 | 3 | 5 | 8 | 6 | 6 | 7 | 15 | 19 | 16 | 19 | 69 | 3.2 |
| Temperat'e | 44.5 | 40.7 | 41.3 | 45.5 | 56.7 | 64.1 | 74.2 | 79.3 | 76.7 | 70.2 | 57.6 | 47.2 | 42.1 | 55.4 | 76.7 | 58.3 | 58.1 | |
| Rainfall..... | 5.30 | 4.68 | 6.66 | 2.03 | 1.79 | 5.01 | 4.61 | 2.74 | 7.45 | 7.13 | 3.64 | 4.13 | 16.64 | 8.83 | 14.80 | 14.90 | 55.17 | |
| Montgomery, | | | | | | | | | | | | | | | | | | |
| Deaths..... | 1 | 3 | 2 | 14 | 5 | 4 | 4 | 3 | 5 | 1 | 5 | 6 | 6 | 23 | 12 | 12 | 53 | 3.53 |
| Temperat'e | 50.2 | 44.1 | 53.3 | 52.1 | 64.2 | 67.1 | 79.2 | 81.8 | 80.2 | 75. | 64.4 | 54.2 | 49.2 | 61.1 | 80.4 | 64.5 | 63.8 | |
| Rainfall..... | 2.61 | 4.97 | 9.97 | 4.51 | 5.57 | 10.25 | 11.08 | 4.17 | 2.56 | 2.38 | .47 | 4.58 | 17.55 | 20.33 | 17.81 | 7.43 | 63.12 | |

## TABLE VII.—Concluded.

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Baltimore— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 88 | 74 | 94 | 140 | 89 | 86 | 100 | 83 | 85 | 112 | 80 | 77 | 256 | 315 | 268 | 269 | 1108 | 3.65 |
| Temperat'e | 40.4 | 34. | 35.5 | 40.3 | 51.9 | 62.3 | 73.9 | 79.4 | 76.3 | 68. | 44.2 | 41. | 36.6 | 51 5 | 76.5 | 51. | 53.9 | |
| Rainfall..... | .97 | 4.27 | 4.74 | 3.02 | 2.77 | 6.31 | .94 | 2.90 | 9.49 | 3.70 | 6.21 | 4.05 | 9.98 | 12.10 | 13.33 | 13.96 | 49.37 | |
| Boston— | | | | | | | | | | | | | | | | | | |
| Deaths... .. | 101 | 128 | 77 | 125 | 101 | 106 | 86 | 103 | 92 | 93 | 81 | 101 | 306 | 332 | 281 | 275 | 1194 | 3.67 |
| Temperat'e | 32.9 | 26.3 | 27.5 | 34.2 | 44.6 | 56.8 | 67.2 | 72.8 | 68.7 | 61.7 | 53. | 33.4 | 28.9 | 45.2 | 69.5 | 49.3 | 48.28 | |
| Rainfall..... | 5.64 | 5.76 | 3.21 | 3.76 | 3.83 | 5.10 | .54 | 3.84 | 6.21 | 2.91 | 5.33 | 8.34 | 14.61 | 12.69 | 10.59 | 16.58 | 54.47 | |
| Charleston— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 20 | 15 | 11 | 17 | 18 | 19 | 22 | 25 | 8 | 12 | 11 | 15 | 46 | 54 | 55 | 38 | 193 | 3.94 |
| Temperat'e | 51.4 | 48.1 | 53.4 | 53.6 | 64.5 | 74.9 | 78.1 | 80.9 | 77.7 | 76. | 63.9 | 54.8 | 50.9 | 64.3 | 78.9 | 64.9 | 64.7 | |
| Rainfall..... | 4.94 | 4.13 | 2.27 | 3.05 | 1.33 | 4.90 | 6.29 | 6.97 | 12.94 | 8.18 | 2.07 | 5.08 | 11.34 | 9.28 | 26.20 | 15.33 | 62.15 | |
| New York— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 339 | 373 | 364 | 405 | 385 | 377 | 301 | 294 | 306 | 330 | 324 | 336 | 1076 | 1167 | 901 | 990 | 4134 | 4.13 |
| Temperat'e | 36.9 | 28.5 | 29.3 | 35.7 | 46.3 | 57.6 | 68.9 | 73.9 | 71.4 | 65.4 | 55.6 | 37.9 | 31.5 | 46.5 | 71.4 | 52.9 | 50.6 | |
| Rainfall..... | 2.24 | 5.06 | 1.73 | 1.88 | 3.05 | 4.08 | 1.29 | 4.15 | 7.69 | 2.51 | 2.47 | 4.01 | 9.03 | 9.01 | 13.13 | 8.99 | 40.16 | |
| Mobile— | | | | | | | | | | | | | | | | | | |
| Deaths..... | 10 | 11 | 9 | 13 | 16 | 13 | 10 | 9 | 17 | 9 | 8 | 12 | 30 | 42 | 36 | 29 | 137 | 4.15 |
| Temperat'e | 54.1 | 46.3 | 56.1 | 57. | 65.7 | 73.9 | 79.4 | 82.2 | 80.2 | 76.1 | 65.2 | 57.7 | 52.1 | 65.5 | 80.6 | 66. | 66.1 | |
| Rainfall..... | 2.97 | 4.16 | 3.15 | 3.86 | .88 | 11.47 | 9.87 | 8.75 | 10.35 | 8.07 | 1.85 | 3.23 | 10.28 | 16 21 | 28.97 | 13.15 | 68.61 | |
| New Orleans, | | | | | | | | | | | | | | | | | | |
| Deaths..... | 72 | 90 | 58 | 66 | 68 | 73 | 58 | 83 | 64 | 67 | 89 | 57 | 220 | 207 | 210 | 213 | 850 | 4.25 |
| Temperat'e | 56.6 | 49.5 | 60.5 | 60.4 | 66.9 | 73.7 | 80.1 | 82.4 | 81.2 | 78.8 | 68.2 | 61.2 | 55.5 | 67. | 81.2 | 69.4 | 68.3 | |
| Rainfall..... | 1.79 | 5.06 | 1.93 | 5.10 | 1.74 | 18.68 | 6.68 | 6.27 | 8.30 | 3.19 | 1.89 | 5.95 | 8.78 | 25.52 | 21.25 | 11.03 | 66.58 | |

I was for some time undecided whether to introduce the present table or not. The sum of data is too slight to allow of general inferences, even though a real concurrence of individual facts could be traced. On the other hand I desired carefully to obviate the idea as if I wished to indicate that the frequency of Phthisis depended upon two climatic influences. But the main object that finally induced me to insert the table, was the wish of directing the attention of the profession to such reflections as may lead to a more correct study of these objects, for which the admirable organisation of the Signal Office affords every opportunity. Before entering upon a discussion of the table, I will at the outset remark that the result which may possibly be deduced therefrom, is of a negative character, as could not a *priori* be otherwise expected. The independence of Phthisis from temperature has too long been known to require many words here. In a former essay of mine, already referred to, I had on page 51 made a comparison of the death-rate under the most various latitudes, the result only proving to be a corroboration of this fact. I added the temperature in the present table in order to establish a comparison if desired. We note a similar condition when we compare the rainfall of single seasons with the death-rate; we obtain no positive result.

If we review the total result of the year somewhat more closely, our table points to one fact at least, to which I desire to attract the reader's attention. Those nine cities having a mortality of over three per 1000 inhabitants, regardless of Baltimore (with only minus 0.63 inch), with the single exception of New York, have a rainfall of over 50 inches during the year. New York itself can, however, scarcely be considered an exception, as a city of such dimensions always has a larger mortality than small ones, and New York is famous for the accuracy and completeness of its records.

This coincidence has also induced me to classify the

cities according to their actual death-rate, although I would warn against the conclusion that I wish to deduce any law on so small a basis.

If, after all this, we still pursue our inquiry as to the true reason of the large mortality in spring and during the first five months of the year in general, it is difficult to elicit a satisfactory answer. Dr. H. Bowditch, of Boston, was kind enough to give me his opinion, to the effect that "in our climate the frequent changes from heat to cold, and wet to dry, in the last part of winter and in spring, and the necessary confinement indoors, were the causes of much suffering and the extra number of deaths of consumptive patients." Fresh air is indispensable for such patients, and at all watering places and climatic establishments the most unlimited use is made of fresh air as the chief remedy. In conclusion, I beg to draw attention to a frequently proven fact of considerable importance in this connection. At the climatic establishment Davos, in Switzerland, which has gained a reputation in our days for the benefit bestowed by it upon consumptives, the observation has been made for some years, that the patients staying there over winter endure the severity of cold air excellently, and that the progress of recovery is in nowise retarded during that season. But no sooner do the spring thaws begin, the snow melt on the heights, and the cold, damp air sink into the valley, than the patients immediately experience a relapse. This observation has been so frequently made that the physicians no longer retain their invalids at Davos during the thaw, but send them away for the time to lower southerly regions, where the snow is already gone, as for instance the Italian lakes. May not a similar relation exist in this country, where such frequent thaws take place in winter and spring, and where cold, damp rain or snow-falls are daily occurrences? These are questions requiring some extensive labor yet, but the answers to which will be of consolation to many a patient capable of withdrawing from

dangerous influences at the right time. When the problem is ripe for solution the reply will not be long coming, and it will afford me pleasure if my remarks may prove instrumental in causing further investigation.

The following three tables, based upon the data obtained from twenty-five life insurance companies within the U. S., are the result of inquiries addressed to thirty-eight companies, nine of which refused to give information, while four did not reply. Since the annual report of the United States Company alone contains medical references which could be used for the tables, my inquiries were limited to the number of policies in force, the lives insured, the deaths from all causes and from Phthisis, to age, sex, and duration of insurance of those who died from Phthisis, all in reference to the year 1873. To enable comparison, a summary of the German companies has been added to each table.

## TABLE VIII.

Since a comparison of the number of policies in force with the death-rate furnishes no result of any import, and since the number of lives insured could be given only by three companies, the following calculation had to be made. Of three other companies the number of lives insured could be calculated from the number of policies and of deaths from all causes; the difference between the policies and lives of those six companies was then reduced to the percentage, and the average resulted for the first three companies in 7.19, for the latter three in 7.83 per cent. Accordingly for all companies which had given no data in that respect, 7.5 per cent. of the number of policies were subtracted to find the number of lives insured. The basis of calculation is given at the foot of the table. But since the number of lives insured is only the result of calculation,

not of actual experience, the companies were arranged according to the percentage of deaths from Phthisis out of all causes. In opposition to cities this order could be followed so much more readily, as the members of a company are so widely distributed, that local circumstances can have but little influence.

# TABLE VIII.

*Deaths from Phthisis and from all Causes in 25 Life Insurance Companies of the United States.*

| Number. | Commenced Business. | COMPANIES. | Number of Lives Insured. | Deaths from all Causes. | Deaths to 1000 Lives. | Deaths from Phthisis. | Deaths from Phthisis to 1000 lives. | Per cent. of Deaths from Phthisis to Total Mortality. |
|---|---|---|---|---|---|---|---|---|
| 1 | 1849 | Union Mutual..... | 18250[1] | 207 | 11.34 | 7 | 0.38 | 3.38 |
| 2 | 1865 | Maryland..... | 1274[2] | 13 | 10.20 | 1 | 0.78 | 7.69 |
| 3 | 1860 | Home ..... | 10507[2] | 98 | 9.32 | 8 | 0.76 | 8.16 |
| 4 | 1850 | Manhattan..... | 12500[2] | 178 | 14.24 | 22 | 1.76 | 12.35 |
| 5 | 1858 | Northwest'n Mut. | 32585[3] | 315 | 9.60 | 42 | 1.28 | 13.33 |
| 6 | 1843 | New Engla'd Mut. | 19632[4] | 221 | 11.25 | 31 | 1.57 | 14.02 |
| 7 | 1846 | Connecticut Mut.. | 50000[2] | 740 | 14.8 | 120 | 2.4 | 16.21 |
| 8 | 1850 | Ætna..... | 48224[2] | 579 | 12.00 | 95 | 1.96 | 16.40 |
| 9 | 1851 | Phœnix Mutual... | 32282[4] | 313 | 9.69 | 52 | 1.61 | 16.63 |
| 10 | 1865 | Universal..... | 6240[3] | 98 | 15.70 | 17 | 2.72 | 17.34 |
| 11 | 1843 | Mutual, New York | 79935[3] | 701 | 8.76 | 129 | 1.61 | 18.40 |
| 12 | 1864 | Brooklyn..... | 4794[3] | 53 | 11.05 | 10 | 2.08 | 18.87 |
| 13 | 1850 | American..... | 13394[3] | 210 | 13.67 | 40 | 2.98 | 19.04 |
| 14 | 1845 | State Mutual..... | 4103[3] | 36 | 8.77 | 7 | 1.70 | 19.44 |
| 15 | 1851 | Massachus'ts Mut. | 13629[4] | 138 | 10.12 | 27 | 1.98 | 19.56 |
| 16 | 1866 | Continental, N. Y. | 25837[3] | 245 | 9.48 | 48 | 1.85 | 19.59 |
| 17 | 1867 | Hartford L.&An'y | 2778[3] | 25 | 9.00 | 5 | 1.79 | 20. |
| 18 | 1850 | Charter Oak..... | 22500[2] | 248 | 11.02 | 51 | 2.26 | 20.56 |
| 19 | 1864 | Continental, H'tfd | 10300[2] | 90 | 8.73 | 20 | 2.94 | 22.22 |
| 20 | 1850 | United States..... | 5593[2] | 91 | 16.27 | 22 | 3.93 | 24.17 |
| 21 | 1866 | Tavelers..... | 8958[2] | 55 | 6.13 | 14 | 1.56 | 25.45 |
| 22 | 1851 | Berkshire..... | 4782[1] | 51 | 10.66 | 13 | 2.71 | 25.49 |
| 23 | 1865 | Provident Life & T | 5350[2] | 39 | 7.28 | 11 | 2.05 | 28.20 |
| 24 | 1860 | Washington..... | 10529[1] | 105 | 9.97 | 30 | 2.84 | 28.57 |
| 25 | 1865 | New Jersey Mut.. | 7700[2] | 41 | 5.32 | 15 | 1.94 | 36.58 |
| | | Total..... | 451676 | 4890 | 10.82 | 837 | 1.85 | 17.11 |
| | | 15 German Co's... | 261026 | 4816 | 18.45 | 989 | 3.79 | 20.53 |

(1) Actual number of lives.
(2) Estimate of the Companies.
(3) Calculated by deduction of 7.5 per cent. from the number of policies.
(4) Derived from death rate.

By a comparison of the two general results we find, as stated in the introduction, a more favorable death-rate in the American companies, both in regard to deaths from all causes and from Phthisis. The apparently great ratio from Phthisis (about one-sixth of all deaths) when compared with that of the cities in Table I. (about one-eighth) is mostly conditioned by the fact that life insurance companies have scarcely any losses of lives under twenty years. If in Table III. we deduct the number of deaths from all causes and from Phthisis occurring under twenty years, we obtain for both sexes, for all ages above twenty years, 226,480 deaths from all causes and 57,716 from Phthisis; that is a percentage of 25.48 of all deaths, which is a considerably higher ratio than both the American and German companies present. It is only just to remark that the New Jersey Mutual company has the lowest death-rate from all causes, which fact accounts for the high percentage from Phthisis.

It may be of interest to compare the general death-rate with the age of the companies. If for a basis we take Oldendorff's calculation, that the duration of insurance of all insured and deceased is nine years, we find the following: By dividing the companies into two groups, one embracing those that existed before 1864, the second those established in 1864 or later, we find that in each case eight of the elder companies present a mortality from all causes above and below the average (10.82), and of the younger companies seven below and only two above the average. In the German companies the ratio is still more striking, five of the older companies showing a general mortality below, nine above the average, four younger companies below and one above the average. When we take into consideration that the older companies have in consequence of their longer existence a greater mortality than younger ones, we find a verification in fifteen cases out of twenty-five in American companies, *i. e.* sixty per cent, and in

thirteen out of nineteen cases in the German companies, *i.e.* sixty-eight per cent. The position of a company stands in immediate relation to the number of deaths among the insured, and were it only for this reason it is desirable that the companies in their annual reports should publish the mortality of the year. Oldendorff's data have solely been taken from the annual reports of the different companies, which give carefully gathered notes concerning the individual cases of death, as to cause, sex, age, season, and duration of insurance.

## TABLE IX.

Twenty-two companies gave the age and sex of those dying from Phthisis. The companies are arranged according to the number of deaths.

# TABLE IX.

*Deaths from Phthisis in relation to Sex and Age, in 22 Life Insurance Companies of the United States.*

| COMPANIES. | Deaths from Phthisis. | | | AGE AT DEATH. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M. | | Total. | Under 25. | 25 to 30. | 30 to 35. | 35 to 40. | 40 to 45. | 45 to 50. | 50 to 55 | 55 to 60 | 60 to 65 | 65 and over. |
| Maryland | 1 | ..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... |
| Hartford Life and Annuity | 5 | ..... | 5 | ..... | 1 | 2 | ..... | ..... | ..... | 1 | 1 | ..... | ..... |
| State Mutual | 7 | ..... | 7 | ..... | ..... | 2 | ..... | 2 | ..... | ..... | 1 | 1 | 1 |
| Union Mutual | 6 | 1 | 7 | ..... | 2 | ..... | ..... | 1 | 2 | ..... | 1 | 1 | ..... |
| Home | 6 | 2 | 8 | ..... | 2 | 1 | 2 | 2 | ..... | 1 | ..... | ..... | ..... |
| Brooklyn | 10 | ..... | 10 | 2 | 1 | 1 | 1 | 2 | 1 | ..... | 1 | 1 | ..... |
| Provident Life and Trust | 10 | 1 | 11 | 1 | 4 | 3 | 1 | 1 | ..... | ..... | ..... | 1 | ..... |
| Berkshire | 12 | 1 | 13 | ..... | 1 | 2 | 3 | 5 | ..... | ..... | ..... | 2 | ..... |
| Travelers | 14 | ..... | 14 | 1 | 1 | 2 | 3 | 5 | 1 | 1 | ..... | ..... | ..... |
| Universal | 14 | 3 | 17 | ..... | 3 | 2 | 4 | 1 | 4 | ..... | 3 | ..... | ..... |
| Manhattan | 22 | ..... | 22 | ..... | ..... | 3 | 6 | 1 | 2 | 3 | 5 | 2 | .... |
| United States | 22 | ..... | 22 | 1 | 1 | 3 | 4 | 3 | 4 | 5 | 1 | ..... | ..... |
| Massachusetts Mutual | 27 | ..... | 27 | 2 | 4 | 3 | 7 | 3 | 2 | 4 | 2 | ..... | ..... |
| New England Mutual | 30 | 1 | 31 | 1 | 4 | 3 | 5 | 5 | 5 | 5 | 1 | 1 | 1 |
| American | 37 | 3 | 40 | ..... | 4 | 8 | 5 | 5 | 5 | 6 | 4 | 1 | 2 |
| Northwestern Mutual | 41 | 1 | 42 | 1 | 9 | 4 | 7 | 9 | 6 | 2 | 3 | 1 | ..... |
| Continental, New York | 41 | 7 | 48 | 3 | 9 | 11 | 9 | 6 | 6 | 1 | 2 | 1 | ..... |
| Charter Oak | 48 | 3 | 51 | 3 | 6 | 13 | 13 | 8 | 2 | 4 | 2 | ..... | ..... |

## TABLE IX.—Concluded.

*Deaths from Phthisis in relation to Sex and Age, in 22 Life Insurance Companies of the United States.*

| COMPANIES. | Deaths from Phthisis. | | | AGE AT DEATH. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M. | F. | Total. | Under 25. | 25 to 30. | 30 to 35. | 35 to 40. | 40 to 45. | 45 to 50 | 50 to 55 | 55 to 60 | 60 to 65 | 65 and over. |
| Phœnix Mutual..... ..... | 42 | 10 | 52 | 1 | 6 | 12 | 12 | 7 | 6 | 2 | 5 | 1 | ..... |
| Ætna..... ..... | 84 | 11 | 95 | 3 | 8 | 16 | 17 | 19 | 8 | 12 | 7 | 1 | 4 |
| Connecticut Mutual..... | 110 | 10 | 120 | 4 | 15 | 11 | 21 | 17 | 22 | 14 | 8 | 5 | 3 |
| Mutual, New York..... | 126 | 3 | 129 | 1 | 21 | 22 | 19 | 21 | 22 | 9 | 7 | 5 | 2 |
| Total..... | 715 | 57 | 772 | 24 | 102 | 125 | 139 | 122 | 98 | 70 | 55 | 24 | 13 |
| Percentage..... | 92.61 | 7.38 | ..... | 3.10 | 13.21 | 16.19 | 18.00 | 15.80 | 12.69 | 9.06 | 7.12 | 3.10 | 1.68 |
| 18 German Companies..... | ..... | ..... | 925 | 24 | 104 | 175 | 180 | 146 | 120 | 83 | 48 | 27 | 18 |
| Percentage..... | ..... | ..... | ..... | 2.59 | 11.24 | 18.92 | 19.46 | 15.78 | 12.97 | 8.97 | 5.19 | 2.92 | 1.95 |

The female sex is represented in remarkably small numbers, and shows in fifteen German companies only 15.9 per cent. of the deaths from Phthisis. Regarding the distribution over different ages we find the greater mortality in advanced years, and in the two total results the maximum is reached in the period between thirty-five and forty years. The divergence between this and the 3d table can be explained from the later admissions to life insurance companies, only twelve under twenty years of age, as may be seen from Table X., this fact causing the distribution of deaths upon the higher ages.

## TABLE X.

The duration of insurance of those who died from Phthisis, given by twenty-two companies, affords a clue to the length of time that single individuals had been affected by the disease, provided they were sound when admitted to the companies. The first column of the different classes of age contains the number of those admitted to the companies in contrast to the preceding table, which shows the number of deaths.

# TABLE X.

*Duration of Insurance of those who Died from Phthisis in 22 Life Insurance Companies of the United States.*

| Number. | COMPANIES. | Under 20. | | | 20 to 25. | | | 25 to 30. | | | 30 to 35. | | | 35 to 40. | | | 40 to 45. | | | 45 to 50. | | | 50 to 55. | | | 55 to 60. | | | 60 and over. | | | TOTAL. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. of Insured. | Average Time. | | No. of Insured. | Average Time. | | No. of Insured. | Average Time. | | No. of Insured. | Average Time. | | No. of Insured. | Average Time. | | No. of Insured. | Average Time. | | No. of Insured. | Average Time. | | No. of Insured. | Average Time. | | No. of Insured. | Average Time. | | No. of Insured. | Average Time. | | No. of Insured. | Average Time. | |
| | | | Y. | M. | | Y. | M. | | Y. | M. | | Y. | M. | | Y. | M. | | Y. | M. | | Y. | M. | | Y. | M. | | Y. | M. | | Y. | M. | | Y. | M. |
| 1 | State Mutual... | .. | .. | .. | 1 | 10 | 10. | 1 | 5 | 5. | 2 | 10 | 5.5 | 2 | 21 | 5. | 1 | 23 | 5. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 7 | 9 | 4.81 |
| 2 | Union Mutual.. | .. | .. | .. | .. | .. | .. | 2 | 3 | .. | 1 | 23 | .. | 1 | 7 | .. | 2 | 4 | .. | .. | .. | .. | 1 | 11 | .. | .. | .. | .. | .. | .. | .. | 7 | 7 | 10.28 |
| 3 | New Eng'd Mut. | .. | .. | .. | 4 | 7 | 3. | 8 | 9 | 3. | 4 | 4 | 9. | 4 | 5 | 9. | 8 | 9 | 1.5 | 2 | 7 | .. | 1 | 8 | .. | .. | .. | .. | .. | .. | .. | 31 | 7 | 8.9 |
| 4 | Manhattan.. .... | .. | .. | .. | .. | .. | .. | 4 | 5 | 9. | 6 | 7 | 8. | 1 | 14 | .. | 6 | 9 | 2. | 1 | 10 | .. | 2 | 5 | 6. | 2 | 4 | 6. | .. | .. | .. | 22 | 7 | 7.63 |
| 5 | Connecticut Mut | 4 | 4 | 6. | 14 | 4 | 5.1 | 22 | 9 | 1.0 | 25 | 7 | 1.4 | 20 | 9 | 10.2 | 15 | 7 | 3.2 | 13 | 8 | 1.8 | 4 | 6 | 3. | 3 | 5 | .. | .. | .. | .. | 120 | 7 | 7.4 |
| 6 | Maryland..... | .. | .. | .. | .. | .. | .. | .... | .. | .. | .... | .. | .. | .... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 7 | .. | 1 | 7 | .... |
| 7 | Mutual, N. Y... | 1 | 7 | .. | 15 | 6 | 1.6 | 32 | 5 | 3.5 | 27 | 7 | 9.3 | 19 | 7 | 5.0 | 19 | 5 | 8.8 | 11 | 9 | 9.8 | 2 | 4 | 6. | 2 | 4 | 6. | 1 | 10 | .. | 129 | 6 | 9.28 |
| 8 | Berkshire..... | .. | .. | .. | 2 | 11 | 8.6 | 3 | 6 | 8.3 | 2 | 8 | 4. | 4 | 2 | 8.1 | .. | .. | .. | 1 | 6 | 4. | 1 | 4 | 9. | .. | .. | .. | .. | .. | .. | 13 | 6 | 4.53 |
| 9 | Massachu'ts Mut | .. | .. | .. | 5 | 4 | .. | 6 | 3 | 6. | 5 | 6 | 9.6 | 6 | 6 | 10. | 1 | 7 | .. | 2 | 10 | .. | 2 | 5 | 6. | .. | .. | .. | .. | .. | .. | 27 | 6 | 4.44 |
| 10 | Charter Oak.... | .. | .. | .. | 9 | 5 | 6.2 | 12 | 5 | 0.3 | 14 | 7 | 8.7 | 10 | 4 | 9.8 | 1 | 4 | 2. | 2 | 4 | 9. | 3 | 4 | 3.3 | .. | .. | .. | .. | .. | .. | 51 | 5 | 9.09 |
| 11 | American..... | 1 | 10 | .. | 2 | 4 | 6. | 7 | 2 | 10.2 | 9 | 6 | 4. | 4 | 6 | .. | 7 | 8 | 1.7 | 7 | 6 | 8.5 | 1 | 4 | .. | 2 | 6 | 6. | .. | .. | .. | 40 | 5 | 7.8 |
| 12 | Phœnix Mutual. | 1 | 6 | .. | 3 | 4 | 8. | 14 | 6 | .. | 12 | 3 | 11. | 7 | 4 | 8 5 | 7 | 6 | 3 4 | 4 | 4 | 3. | 4 | 6 | 3. | .. | .. | .. | .. | .. | .. | 52 | 5 | 2.3 |
| 13 | Home..... | .. | .. | .. | 2 | 6 | 1.5 | .... | .. | .. | 1 | 4 | .. | 3 | 3 | 8.3 | 1 | 3 | 6. | 1 | 9 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 8 | 4 | 11.73 |
| 14 | Ætna..... | 2 | 5 | 9.5 | 6 | 3 | 5. | 17 | 4 | 2.1 | 20 | 5 | 6.0 | 17 | 4 | 5.7 | 12 | 5 | 0.5 | 11 | 6 | 0.9 | 6 | 5 | 5.6 | 2 | 6 | 3.5 | 2 | 6 | 7.5 | 95 | 4 | 11.62 |
| 15 | Northwes'n Mut | .. | .. | .. | 5 | 4 | 9 6 | 10 | 4 | 4.8 | 8 | 5 | 1.5 | 8 | 5 | 10.5 | 6 | 4 | 6. | 1 | 8 | .. | 3 | 5 | 4. | 1 | 1 | .. | .. | .. | .. | 42 | 4 | 11.42 |
| 16 | Brooklyn..... | 1 | 4 | 7. | 2 | 4 | 3.5 | 1 | 2 | 4. | 1 | 3 | 9. | 1 | 3 | .. | 1 | 1 | 7. | 1 | 7 | 7. | 1 | 5 | 3. | 1 | 8 | 4. | .. | .. | .. | 10 | 4 | 6. |
| 17 | Universal..... | .. | .. | .. | 1 | 4 | .. | 3 | 3 | .. | 4 | 4 | 6. | 3 | 3 | 4. | .. | .. | .. | 4 | 4 | .. | 2 | 5 | .. | .. | .. | .. | .. | .. | .. | 17 | 4 | 1.4 |
| 18 | Hartford L. & A. | .. | .. | .. | 1 | 4 | .. | 2 | 2 | .. | .... | .. | .. | .... | .. | .. | .. | .. | .. | 1 | 5 | .. | 1 | 6 | .. | .. | .. | .. | .. | .. | .. | 5 | 3 | 9.6 |
| 19 | Contin'l, Hartf'd | .. | .. | .. | .. | .. | .. | .... | .. | .. | .... | .. | .. | .... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 20 | 3 | 4.68 |
| 20 | Contin'l, N. Y... | 1 | 3 | .. | 7 | 3 | .. | 14 | 3 | .. | 7 | 4 | 5.1 | 6 | 2 | 2. | 9 | 3 | 4. | 1 | 3 | .. | 2 | 5 | .. | .. | .. | .. | 1 | 2 | .. | 48 | 3 | 2.75 |
| 21 | Provident L.&T. | .. | .. | .. | 2 | 2 | 10.5 | 4 | 2 | 7.7 | 2 | 1 | 4.5 | 2 | 4 | 8 5 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 4 | 3. | .. | .. | .. | 11 | 2 | 11.72 |
| 22 | Travelers..... | 1 | 1 | 8. | .. | .. | .. | 2 | 3 | 1. | 4 | 3 | 8. | 3 | 3 | 8.3 | 2 | 2 | 9. | 1 | 1 | 2. | 1 | 0 | 9. | .. | .. | .. | .. | .. | .. | 14 | 2 | 11.28 |
| | Total..... | 12 | 5 | 3.82 | 81 | 5 | 4.62 | 164 | 4 | 6.62 | 154 | 6 | 7.71 | 121 | 6 | 4.67 | 98 | 6 | 6.74 | 64 | 6 | 6 23 | 37 | 5 | 5.52 | 14 | 5 | 0.56 | 5 | 6 | 4.87 | 770 | 5 | 7.21 |
| | 18 German Co's | 5 | 2 | 1.52 | 86 | 5 | 2.91 | 197 | 5 | 7.50 | 242 | 5 | 4.61 | 163 | 6 | 8 93 | 99 | 6 | 2.32 | 73 | 7 | 0.44 | 40 | 5 | 2.92 | 17 | 5 | 3.39 | 3 | 3 | 6.33 | 925 | 5 | 10.19 |

A remarkable coincidence is observable in the total results of the twenty-two American and the eighteen German companies, and the trifling difference against our companies would surely be counterbalanced, if ours were as old as the German ones. Of the twenty-five companies enumerated in Table VII. only fourteen existed before the year 1860 (or fifty-six per cent.); of the nineteen German companies, thirteen (or sixty-eight per cent.); and three of these existed already before 1840, the oldest being organised 1827; while the two oldest of this country, the Mutual New York and the New England Mutual, were not established until 1843. For the same reason we see in the table the older companies possessing the longest duration of insurance. Respecting the shortest time, it must be stated that fifty-four deaths occurred amongst members who had been insured one year or less. I can not forbear to state as my opinion that at least some of these losses could possibly have been avoided, if at the medical examination a proper use of the Spirometer had been made, the value of which for life insurance companies I have already pointed out in an August No. of the *Baltimore Underwriter*. The shortest duration of insurance of any was three months.

In conclusion, I beg to return my sincere thanks to all those who have enabled me by their courtesy in furnishing material, and by their kind appreciation of the object in view, to write this paper.